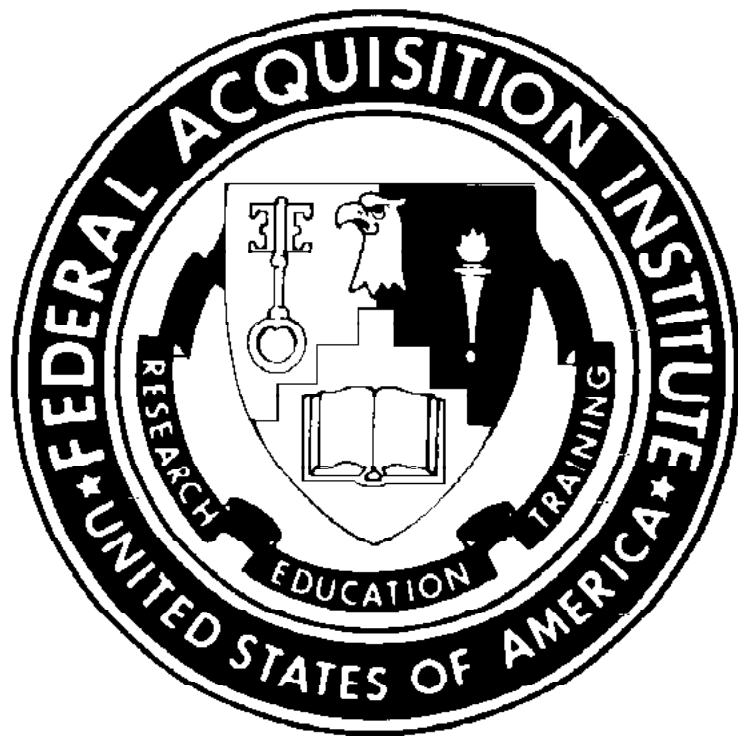


COST ANALYSIS

TEXT/REFERENCE



**FEDERAL ACQUISITION INSTITUTE
OFFICE OF ACQUISITION POLICY
DECEMBER 1993 (FAC 90-19)**

PREFACE

ACKNOWLEDGMENTS, FIRST EDITION

Prepared for the Federal Acquisition Institute

*By M. Dale Shields, Ph.D., and Jack Hott
Production Management Development
Dayton, Ohio*

*Pursuant to a contract with CAE-LINK Corporation
Falls Church, Virginia*

I would like to thank the following for their assistance in preparing and reviewing this text.

Jack Livingston, Director
Federal Acquisition Institute

Michael Miller
Team Leader, Cost and Price Analysis
Federal Acquisition Institute

Joyce Allen
Pricing and Contract Administration
Division (SAF/AQCP)
Office of Assistant Secretary (Acquisition)
United States Air Force

Donette Cappello
Department of Energy (PR-14)

Patrick Conley
Office Equipment Division (FCGE)
Federal Supply Service
General Services Administration

Gary Craig
GSA Interagency Training Center
General Services Administration

Jerry C. Gilbart
Contracting Directorate (DLA-PPR)
Defense Logistics Agency

Major Janie Maddox
School of Systems and Logistics
(AFIT/LSQ)
Air Force Institute of Technology

James Murphy
Patent & Trademark Office
Department of Commerce

Jeremy F. Olsen
Office of Acquisition Policy (VR)\
General Services Administration

David Schuur
Contracting Management Directorate (021B)
Naval Supply Systems Command
Department of Navy

PREFACE**Second Edition, April 1994**

The first edition was released October 1992. For this edition, we have edited virtually every page to improve clarity and make various minor corrections. Among the most significant changes:

- In the Introduction, we have expanded and improved coverage of the term “fair and reasonable”.
- In Chapter 1, we improved the definitions of estimating and accounting systems.
- In Chapter 2, we have provided more detailed examples of “limited or partial” data.
- Chapter 4 has been reorganized to more sharply distinguish between “program” and “procurement” histories and provide better coverage of data available from each.
- In Chapter 6, we have improved the presentation of steps in stratified sampling, simplified the formulas for use of index numbers, and corrected the example for line-of-best-fit.
- In Chapter 7, we have (1) simplified the presentation of summary estimates and (2) clarified differences between Time Studies, Predetermined Level Times, Standard Time Data, and Work Sampling.
- In Chapter 8, we added a short section on uncompensated overtime.
- In Chapter 10, we have corrected several examples, reordered the steps in estimating indirect costs, and improved coverage of the overhead allocation cycle.
- In Chapter 12, we have augmented coverage of the DoD Weighted Guidelines by borrowing material from the text/reference for the Defense course CON 104, “Contract Pricing.”
- Chapter 14 has been reorganized and updated to reflect more recent Comptroller General decisions.

We would like to express our gratitude to the staff of the Air Force Institute of Technology (AFIT). The AFIT staff rewrote this book for use in CON 104, “Contract Pricing.” Many of the improvements to this second edition came from their rewrite. In addition, several AFIT staff members provided extensive review and feedback of draft revisions to the Introduction, Chapter 6, and Chapter 10 — especially Major Janie Maddox and Leo J. Mercier. Finally, members of the Interagency Pricing Curricula Advisory Team, which is supporting the development of an Intermediate Pricing Course, also provided valuable feedback on the Introduction, Chapter 6, and Chapter 10.

I would also like to express my appreciation to Mary Ridgeway, Linda Gaugler, and Diane M. Frazier of the National Aeronautics and Space Administration. These individuals reviewed this entire book and provided many valuable suggestions.

Finally, I would like to invite all readers of this document to write us with comments, praise, expressions of disgust, and any other feedback. The Federal Acquisition Institute address:

Federal Acquisition Institute (VF)
General Services Administration
18th and F. Streets NW, Rm. 4019
Washington DC 20405

PREFACE

COST ANALYSIS

CONTENTS

INTRODUCTION

I.1 Definitions of “Price”	I-2
I.2 Seller's Pricing Objectives	I-3
I.3 Seller's Approaches to Pricing	I-4
I.4 Government's Pricing Objective	I-5
I.4.1 Pay a Fair and Reasonable Price	I-6
I.4.2 Price Each Contract Separately	I-12
I.4.3 Exclude Contingencies	I-13
I.5 Market Environment Effect on Pricing	I-14
I.6 Participants in Cost Analysis	I-16

1. COSTS AND COST ANALYSIS

1.1 Cost	1-5
1.1.1 The Meaning Of “Cost”	1-7
1.1.2 Contract Cost.....	1-8
1.2 Price And Cost Analyses.....	1-9
1.2.1 Price Analysis	1-10
1.2.2 Bases Of Price Analysis	1-11
1.2.3 Cost Analysis	1-12

1.3 Planning For Cost Analysis.....	1-13
1.3.1 Planning for Cost Analysis	1-14
1.3.2 Relationship between Cost Estimating and Cost Accounting.....	1-16
1.3.3 Cost Estimating Principles and Methods	1-20

2. COST OR PRICING DATA

2.1 Cost Or Pricing Data	2-4
2.1.1 Cost Or Pricing Data	2-5
2.1.2 Determining When Certified Cost Or Pricing Data Are Required	2-7
2.2 Determine The Applicability Of Exemptions From The Requirement.....	2-10
2.2.1 Determining Exemptions From The Requirement.....	2-11
2.2.2 Exemptions Based On Adequate Price Competition	2-12
2.2.3 Exemptions Based On Catalog Pricing	2-13
2.2.4 Exemptions Based On Market Pricing.....	2-15
2.2.5 Exemptions Based On Regulated Pricing	2-16
2.2.6 Waiver Of Data Requirements	2-17
2.3 Key Cost Proposal Elements.....	2-18
2.3.1 Contract Pricing Proposal Cover Sheet.....	2-19
2.3.2 Tailored Data.....	2-25
2.4 Certificate Of Current Cost Or Pricing Data.....	2-26
2.4.1 Obtaining Properly Executed Certificate	2-27
2.4.2 Elements Of A Properly Executed Certificate	2-28
2.4.3 Consequences Of Certifying Defective Data	2-29
2.5 Limited Or Partial Data	2-26

3. ALLOWABILITY

3.1 General Cost Principles On Allowability.....	3-5
3.1.1 Allowability	3-6
3.1.2 Reasonableness	3-7
3.1.3 Allocability.....	3-10
3.1.4 Accounting Practices And Standards	3-12
3.1.5 Contract Terms.....	3-17

Specific Cost Principles	3-18
3.2.1 Specific Cost Principles	3-19
3.2.2 Table of Cost Principles	3-21
3.2.3 Identifying Unallowable Costs.....	3-24
3.2.4 Applying Selected Cost Principles.....	3-26

4. DATA COLLECTION

4.1 Collecting And Reviewing Available Data.....	4-5
4.1.1 Review The Proposal Against The RFP	4-6
4.1.2 Review Program Histories	4-8
4.1.3 Review Procurement Histories.....	4-10
4.1.4 Review Forward Pricing Rates	4-13
4.1.5 Contractor System Reviews	4-14
4.1.6 Market Research	4-17
4.2 Requesting And Analyzing Technical Support.....	4-18
4.2.1 Technical Support Request	4-19
4.2.2 Technical Support Analysis	4-20
4.3 Requesting And Analyzing Audit Support	4-24
4.3.1 Need For Audit Support	4-25
4.3.2 Audit Support Request	4-26
4.3.3 Assist Audit.....	4-28
4.3.4 Reviewing The Audit Evaluation.....	4-30

5. WORK DESIGN AND ANALYSIS

5.1 Offeror's Planning Assumptions	5-5
5.1.1 Identify Planning Assumptions	5-6
5.1.2 Analyze Offeror's Assumptions	5-8
5.1.3 Analyze Offeror's Contingencies	5-13
5.1.4 Use A Structured Breakdown To Relate Costs	5-15
5.2 Should-Cost Principles In Objective Development	5-17
5.2.1 Identify Causes Of Inefficient Or Uneconomical Performance	5-18
5.2.2 Review Potential Sources Of Data On Inefficient Or Uneconomical Performance	5-21
5.2.3 Review Formal Should-Cost Analyses	5-22

5.3	Cost Risk And Related Contract Decisions	5-25
5.3.1	Identify Principal Sources of Cost Risk	5-26
5.3.2	Assess the Level of Risk	5-28
5.3.3	Select Contract Type To Reduce Exposure To Risk.....	5-31
5.3.4	Provide Clear Contact Requirement	5-38
5.3.5	Use Government Furnished Property to Manage Cost Risk	5-39
5.4	Using Your Work Design Analysis	5-41
5.4.1	Using Your Work Design Analysis	5-42

6. ESTIMATING/ANALYSIS TECHNIQUES

6.1	Sampling	6-5
6.2	Index Numbers	6-10
6.2.1	Price Index Numbers.....	6-11
6.2.2	Government And Commercial Indexes.....	6-14
6.2.3	Adjusting Price For Inflation/Deflation	6-17
6.3	Cost-Volume-Profit Analysis.....	6-25
6.3.1	Cost-Volume-Profit Analysis.....	6-26
6.3.2	Linear Cost-Volume Relationship	6-28
6.3.3	Cost-Volume-Profit Relationship	6-36
6.4	Fitting A Line-Of-Best-Fit	6-40
6.4.1	Fitting A Line-Of-Best-Fit	6-41
6.4.2	Visually Fitting A Line	6-42
6.4.3	Least-Squares-Best-Fit Line Fitting.....	6-48
6.5	Economic Forecasts	6-50
6.5.1	Sources Of Economic Forecasts	6-51
6.5.2	Preparing Economic Forecasts	6-52
6.6	Cost Estimating Relationships	6-55
6.6.1	Cost Estimating Relationships	6-56
6.6.2	Developing A Cost Estimating Relationship	6-58

6.7 Moving Averages	6-67
6.7.1 Uses Of Moving Averages	6-68
6.7.2 Developing A Simple Moving Average.....	6-69
6.7.3 Other Types Of Moving Averages	6-72
6.8 Improvement Curve Analysis	6-74
6.8.1 Improvement Curve Analysis	6-75
6.8.2 Basic Improvement Curve Theories	6-79
6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory	6-82
6.8.4 Interpret Improvement Curves Using Lot Data	6-90
6.8.5 Fitting and Projecting an Improvement Curve.....	6-94

7. DIRECT MATERIAL COSTS

7.1 Proposed Direct Material Mix.....	7-5
7.1.1 Identify Direct Material Elements.....	7-6
7.1.2 Identify Collateral Costs	7-8
7.1.3 Identify Related Costs	7-9
7.1.4 Analyze Proposed Direct Material Mix	7-12
7.2 Summary Cost Estimate	7-15
7.2.1 Analyze Summary Cost Estimates	7-16
7.2.2 Examples	7-21
7.3 Detailed Cost Estimate	7-23
7.3.1 Analyze Proposed Quantities	7-24
7.3.2 Analyze Proposed Unit Prices.....	7-29
7.4 Major Subcontract Requirements.....	7-40
7.4.1 Evaluate Subcontract Pricing	7-41

8. DIRECT LABOR COSTS

8.1 Analyze Direct Labor Mix	8-5
8.1.1 Identify Classifications Of Direct Labor.....	8-6
8.1.2 Major Types Of Direct Labor	8-8
8.1.3 Analyze Direct Labor Mix	8-9

8.2 Analyze Labor Hour Estimates	8-11
8.2.1 Round-Table Estimates	8-16
8.2.2 Comparison Estimates.....	8-19
8.2.3 Improvement Curves.....	8-26
8.2.4 Labor Standards	8-31
Analyze Wage Rates	8-39
8.3.1 Wage Rate Analysis	8-40
8.3.2 Geographic Location.....	8-41
8.3.3 Variation In Skill.....	8-43
8.3.4 Time Period Of The Labor Requirement	8-47
8.3.5 Conditions in the Work Force	8-51

9. OTHER DIRECT COSTS

9.1 Types Of Other Direct Costs.....	9-4
9.1.1 Other Direct Costs.....	9-5
9.1.2 Travel	9-6
9.1.3 Consultants And Contract Labor.....	9-9
9.1.4 Preproduction Costs	9-11
9.1.5 Special Tooling And Test Equipment	9-15
9.1.6 Computer Time and Printing.....	9-19
9.1.7 Federal Excise Tax.....	9-21
9.1.8 Royalties.....	9-23
9.2 Special Estimating Concerns	9-25
9.2.1 Special Estimating Concerns	9-26

10. INDIRECT COSTS

10.1 Importance And Composition Of Indirect Costs	10-4
10.1.1 Importance And Composition Of Indirect Costs	10-5
10.1.2 Direct/Indirect Cost Decision.....	10-8

10.2 Indirect Cost Rates	10-10
10.2.1 Indirect Rate Formula	10-11
10.2.2 Indirect Cost Pools	10-12
10.2.3 Bases	10-16
10.2.4 Steps In Estimating Indirect Costs	10-18
10.3 Indirect Cost Allocation Cycle.....	10-24
10.3.1 The Indirect Cost Allocation Cycle	10-25
10.3.2 Examples Of Indirect Cost Pools	10-33
10.3.3 Analysis Of Proposed Indirect Cost Forward Pricing Rates.....	10-38
10.3.4 Indirect Cost Certifications	10-47

11. FACILITIES CAPITAL COST OF MONEY

11.1 Fundamentals Of Facilities Capital Cost Of Money	11-4
11.1.1 Background On Facilities Capital Cost Of Money	11-5
11.1.2 Basics Of Cost Allowability	11-6
11.1.3 Facilities Capital Cost Of Money Under Cas 414 And 417.....	11-8
11.2 Developing Facilities Capital Cost Of Money Factors	11-9
11.2.1 Developing Facilities Capital Cost Of Money Factors	11-10
11.2.2 Historical And Projected Methods Of Net Book Value Calculation	11-14
11.3 Applying Facilities Capital Cost Of Money Factors To Specific Contracts.....	11-16
11.3.1 Applying Facilities Capital Cost Of Money Factors to Specific Contracts	11-17
11.3.1 DD Form 1861	11-19

12. PROFIT OR FEE

12.1 General Factors	12-4
12.1.1 Required Structured Analysis	12-5
12.1.2 Contractor Profit Motivation.....	12-6
12.1.3 Factors To Consider	12-7
12.2 Nasa Structured Approach	12-9
12.2.1 Nasa Form 634	12-10
12.2.2 Exemptions.....	12-16

12.3	Dod Weighted Guidelines	12-17
12.3.1	Dod Weighted Guidelines	12-18
12.3.2	Weighted Guidelines Calculations	12-21
12.3.3	Exemptions from Weighted Guidelines	12-37

13. PREPARING FOR NEGOTIATION

13.1	Trade-Off Analysis	13-5
13.1.1	Perform Overall Price Analysis	13-6
13.1.2	Involve Negotiation Team In Trade-Off Analysis	13-7
13.1.3	Cost Drivers And Tradeoffs	13-8
13.1.4	Cost Risk	13-10
13.2	Contract Type And Prenegotiation Objectives	13-13
13.3	Documentation	13-20
13.3.1	Rationale and Factual Support	13-21
13.3.2	Price Prenegotiation Memorandum Checklist	13-25

14. COST REALISM ANALYSIS

14.1	Objective and Purpose	14-4
14.2	Steps In Cost Realism Analysis	14-5
14.3	Resolving Unrealistic BAFOs In Competitive Acquisitions	14-8

APPENDICES

- 1. Acronyms**
- 2. Glossary**
- 3. FAR References**
- 4. Index**

Introduction

Chapter Overview

Overview

The subject of this text is cost analysis. As you will learn, cost analysis is one of the two methods of determining price reasonableness in contract pricing. To understand cost analysis, you must first understand the contract pricing environment. After reading this introduction, you should be able to:

- Define contract pricing
 - Describe seller strategies and their potential impact on seller cost estimates
 - List and define the Government's pricing goals
 - List typical participants in cost analyses
-

Maps in This Chapter

This chapter contains the following maps:

I.1 Definitions of "Price"	I-2
I.2 Seller's Pricing Objectives	I-3
I.3 Seller's Approaches to Pricing	I-4
I.4 Government's Pricing Objective	I-5
I.4.1 Pay a Fair and Reasonable Price	I-6
I.4.2 Price Each Contract Separately	I-12
I.4.3 Exclude Contingencies	I-13
I.5 Market Environment Effect on Pricing.....	I-14
I.6 Participants in Cost Analysis	I-16

I.1 Definitions of “Price”

Definitions

From both work and personal business dealings, most people think of price as—

the amount of money that a buyer pays a seller for the delivery of a product or the performance of a service.

| | |------------| | FAR 15.801 | |------------|

The definition of price in FAR 15.801 emphasizes its components:

“cost plus any fee or profit applicable to the contract type.”

In this course, both definitions of price are important. Primarily, price is defined as the amount the buyer pays for a product or service. However, it is important to remember that, if price does NOT cover supplier costs and provide a profit, losses will occur. A firm that is losing money is typically an unreliable supplier—possibly a bankrupt supplier.

I.2 Seller's Pricing Objectives

Pricing Objectives

To sellers, contract pricing has two primary, related objectives:

- To cover costs
 - To contribute to attaining corporate operational objectives
-

Cover Costs

Obviously, a firm that cannot cover its costs cannot survive. Many firms would have us believe that they lose money on every unit they sell, but make up for it in volume. Unfortunately, business does not work that way.

Corporate Operational Objectives

Every firm has a set of operational objectives. Clear objectives are necessary to assure profitability. Examples include:

- Short-term and/or long-term profitability
- Market share
- Long-term survival
- Product quality
- Technological leadership
- High productivity

To attain its operational objectives, a firm must cover its costs and earn an overall profit. Some products may sell for less than cost, but if they do, other products must make sufficient profit to compensate for those losses. Profits are essential for:

- Investment
 - Product Development
 - Productivity Improvement
 - Payment of Debts
 - Rewarding Investors
-

I.3 Seller's Approaches to Pricing

Seller's Pricing Approaches

In pricing products, sellers use two basic approaches. The table below compares the two approaches to pricing.

PRICING APPROACHES	STRATEGIES
Cost-based pricing:	<ul style="list-style-type: none"> • Mark-up Pricing • Margin on Direct Cost • Rate of Return Pricing
Market-based pricing:	<ul style="list-style-type: none"> • Profit-Maximization Pricing • Market-Share Pricing • Market Skimming • Current-Revenue Pricing • Target-Profit Pricing • Promotional Pricing • Demand-Differential Pricing • Market-Competition Pricing

Market Environment and Reliance on Cost Base

Each of the approaches identified above is described in detail in the Price Analysis course text. For our purposes in this course, it is important to understand that cost-based pricing strategies base prices on projected costs and profit objectives. In market-based pricing, costs and profit objectives are important, but prices are moderated by market forces and the firm's overall marketing strategy.

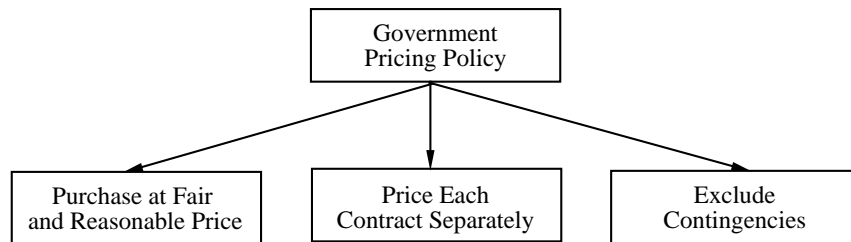
I.4 Government's Pricing Objective

Government's Pricing Objectives

FAR 15.802(b)

The FAR prescribes three main pricing objectives:

- purchase supplies and services from responsible sources at fair and reasonable prices
- price each contract separately and independently and
 - (1) do NOT use proposed price reductions under other contracts as an evaluation factor, or
 - (2) do NOT consider losses or profits realized or anticipated under other contracts
- Exclude any amount for a specified contingency if the contract provides for price adjustment based upon the occurrence of that contingency.

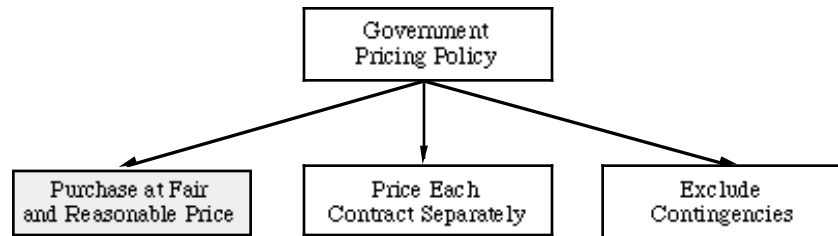


I.4.1 Pay a Fair and Reasonable Price

What Is “Fair and Reasonable?”

FAR 15.803(d)

In pricing a contract, your most important objective is to balance the contract type, cost, and profit or fee negotiated to achieve a total result and price **fair and reasonable** to both the buyer (i.e., the Government) and the seller (i.e., the contractor).



Fair to the Buyer

“Fair to the buyer” means a price that is in line with (or below) the fair market value of the contract deliverable (to the extent that fair market value can be approximated through price analysis). “Fair market value” is the price you **should** expect to pay, given the prices of bona fide sales between informed buyers and informed sellers under like market conditions in competitive markets for deliverables of like type, quality, and quantity.

When data on probable performance costs are available, a separate test of “fairness” is whether the proposed price is in line with (or below) the total allowable cost of providing the contract deliverable that would be incurred by a **well managed, responsible firm using reasonably efficient and economical methods** of performance + a reasonable profit.

Can a firm fixed price be considered unfair even if the seller's actual costs exceed the price? Yes, if the high costs result from slipshod management, obsolete tooling, and other such causes. The question is how the firm fixed price compares to what the work ought to have cost.

What happens if you agree to a price that is unfair to the buyer?

- You will have failed to fulfill your most basic and fundamental fiduciary duty as a contracting officer for the Government.
- You will waste limited Government funds.
- Since Federal employees are publicly accountable for their decisions, you may have to answer to your management, your agency head, the Inspector General, the General Accounting Office, a Congressional committee, or the public at large.

(continued on next page)

I.4.1 Pay a Fair and Reasonable Price

(continued)

Fair to the
Buyer

(continued)

Can a price be considered "fair" but not reasonable? Yes. For example, a price may be fair today but not reasonable if, because of changing market conditions, the price tomorrow will be half what it is today. If the Government mission can wait a day, a reasonably competent buyer would not pay today's price even though it is a "fair" price by the above tests.

Fair to the
Seller

"Fair" to the seller means a price that is realistic in terms of the seller's ability to satisfy the terms and conditions of the contract. Why should you care if a low offer is realistic? Because an unrealistic price puts both parties at risk. The risk to the Government is that the seller — to cut its losses — might:

- Cut corners on product quality
- Deliver late
- Default, forcing a time-consuming, costly reprocurement
- Refuse to deal with the Government in the future
- Be forced out of business entirely

Below-Cost Prices

Below-cost prices are not necessarily unfair to sellers. "A bidder, for various reasons, in its business judgment may decide to submit a below-cost bid; such a bid is not invalid. ... Whether the awardee can perform the contract at the price offered is a matter of responsibility." (Comp. Gen. Decision B-238877, Matter of: Diemaster Tool, Inc., April 5, 1990).

FAR 3.501

On the other hand, be on guard against "buy-in" prices. Firms "buy-in" by submitting offers below anticipated costs, expecting to—

- Increase the contract amount after award (e.g., through unnecessary or excessively priced change orders); or
- Receive follow-on contracts at artificially high prices to recover losses incurred on the buy-in contract.

Section 3.501 of the FAR presents a number of techniques to prevent such a contractor from recovering buying-in losses. One is "treatment of unreasonable price quotations", with reference to FAR 15.803(d). This FAR section (among other things) advises contracting officers to consider risks to the Government represented by the proposed contract type and price.

(continued on next page)

I.4.1 Pay a Fair and Reasonable Price

(continued)

Fair to the
Seller

(continued)

FAR 9.103(c)

Mistakes

The offered price may be unexpectedly low because the seller has made gross mistakes in estimating costs or is otherwise nonresponsible. “The award of a contract to a supplier based on lowest evaluated price alone can be false economy if there is subsequent default, late deliveries, or other unsatisfactory performance resulting in additional contractual or administrative costs. While it is important that Government purchases be made at the lowest [evaluated] price, this does not require an award to a supplier solely because that supplier submits the lowest offer. A prospective contractor must affirmatively demonstrate its responsibility, including, when necessary, the responsibility of its proposed subcontractors.”

FAR 15.608

Hence, the purpose of price or cost analysis is not only to determine whether an offered price is reasonable, but also to determine the offeror's understanding of the work and ability to perform the contract. If a vendor offers a price that is **far** below other offered prices or your estimate of the probable price, treat the offer as a potential “mistake”. During factfinding and discussions, question whether the offeror understands the work and can perform for that price. If the firm's Best and Final Offer remains well off the mark, undertake a cost realism analysis as described in Chapter 14.

(continued on next page)

I.4.1 Pay a Fair and Reasonable Price

(continued)

Reasonable

A **reasonable** price is a price that a prudent and competent buyer would be willing to pay for the contract deliverable, given adequate data on (1) market conditions, (2) alternatives for meeting the requirement, (3) the evaluated price of each alternative, and (4) non-price evaluation factors (in "best value" competitions).

Market Conditions

Because economic forces such as supply, demand, competition, and general economic conditions change constantly, price reasonableness is affected. A price that is reasonable today may not be reasonable tomorrow. See *Market Environment Effect on Pricing*, page I-14.

Examples: Major market forces are described below:

- If demand is constant, decreasing supply usually results in higher prices, while increasing supply usually results in lower prices.
- If supply is constant, falling demand usually forces vendors to lower prices, while rising demand usually leads to higher prices.
- The forces of supply and demand work effectively only when there are multiple buyers and multiple sellers. NOT all markets are competitive. When they are NOT, the buyer or seller may have an advantage in the pricing decision.
- Inflation and deflation affect the value of the dollar. Boom, recession, and depression affect general production capacity.

Alternatives

In competitive procurements, each offer represents a separate alternative for satisfying the requirement. However, competitive offers are never the only alternatives for meeting the requirement. Among other alternatives:

- Canceling and resoliciting when market conditions are more favorable.
- In-house performance.
- A different technical solution.
- Bringing another offeror on line.
- Breaking out and separately competing subcomponents.

Give serious thought to such alternatives when the low offer does not appear to meet the test of "fairness to the buyer" — especially if the procurement is non-competitive.

(continued on next page)

I.4.1 Pay a Fair and Reasonable Price

(continued)

Reasonable
(continued)

Evaluated Price of Each Alternative

A prudent buyer will consider not only the price tag of a contract deliverable but any cost of acquiring and owning the deliverable not covered by the contract price. For instance, a prudent buyer will pay \$50 more for Brand X air conditioners than for Brand Y air conditioners, if Brand Y air conditioners use \$75 more power on average per cooling season (all other things being equal).

In competitive procurements based on fixed prices, Government buyers may incorporate price-related factors in solicitations to account for the costs of acquiring and/or owning the deliverable. After receipt of offers, price-related factors are applied to determine the "evaluated price" of each offer. Similarly, contracting officers must determine the "evaluated total estimated cost" of Best and Final Offers in competitive procurements of cost reimbursable contracts (as described in Chapter 14).

Examples:

- **Direct Costs Not Included In The Contract Price.** The solicitation allowed offerors to submit offers either for f.o.b. destination or f.o.b. origin. To identify the low offer, you must add the Government's shipping costs to offered f.o.b. origin prices.
- **Costs of Ownership Not Included In The Contract Price.** Prior to soliciting, your market research has identified two products which could satisfy your requirement. Product A has the lowest commercial price tag. However, Product B is more reliable and less costly to repair — which could save the Government thousands of dollars over its useful life. When operating costs are important and quantifiable, develop price-related factors to reflect them.
- **Costs of Contract Award and Administration.** Your RFP solicited line item by line item prices and also an aggregate price for all line items. The contracting officer could split the line items among five offerors, which would result in a total price of \$100,000. Or the contracting officer could award all line items to the firm that offered the lowest aggregate price — \$100,300. When multiple awards are possible, the FAR directs contracting officers to assume an administrative cost to the Government of \$500 per contract. Given this assumption, the aggregate award represents a total cost of \$100,800 vs. a total cost of \$102,500 for five awards.

FAR 15.605(f)

(continued on next page)

I.4.1 Pay a Fair and Reasonable Price

(continued)

Reasonable
(continued)

Even in noncompetitive procurements, be alert to potential risks and costs not covered in the offered price. A price that seems reasonable on the surface may be unreasonable if proposed terms and conditions would shift costs to the Government. For instance, an offered price may seem reasonable until you discover that the proposed terms and conditions have shifted responsibility for furnishing the necessary tooling from the firm (per the RFP) to the Government (per the proposal). Likewise, a contractor's proposed price, regardless of amount, might be unreasonable if conditioned on the use of a cost reimbursement contract that transfers an inappropriate portion of the risk of cost growth to the Government.

Non-Price Evaluation Factors

FAR 15.605

In some acquisitions, the test of reasonableness is whether an offered price represents the "best value" for the Government's dollar, considering both price-related factors and also such non-price factors as the relative technical capabilities of the competing firms and the relative performance risks of each offer. In particular, do not compete cost reimbursable contracts primarily on the basis of lowest proposed total estimated cost. That would only encourage offerors to submit unrealistically low estimates and increase the likelihood of cost overruns.

Bottom Line

FAR 15.803(c)

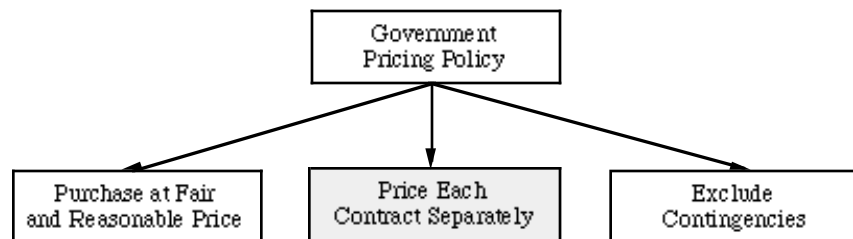
In the final analysis, "fair and reasonable" is a matter of judgement. Reasonable compromises may be necessary, and it may not be possible to negotiate a price that is in accord with all the contributing specialists' opinions or with the contracting officer's prenegotiation objective. The contracting officer is solely responsible for the final pricing decision.

What if there
is no
alternative to
an unfair
price?

FAR 15.803(d)

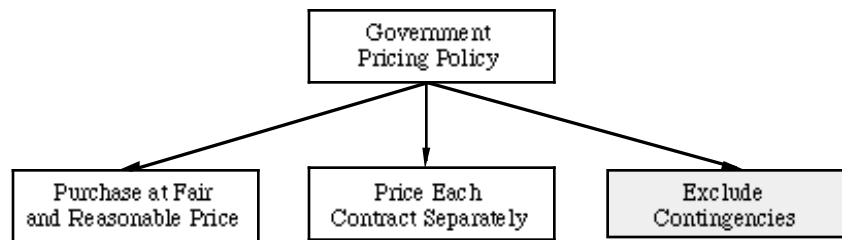
Sometimes, the only reasonable alternative is to pay an unfair price. If the contractor insists on an unfair price or an unfair profit or fee and the contracting officer has taken all authorized actions (including determining the feasibility of developing an alternative source) without success, the contracting officer shall then refer the contract action to higher authority. In such cases, document disposition of the action by higher authority.

I.4.2 Price Each Contract Separately



Introduction	It is human nature to try to balance one contract against another in terms of financial results.
Seller's perspective	A seller's position might be that, because the last contract lost money, an effort should be made to make up the loss on the next one.
Buyer's Perspective	A buyer's position might be that the contractor made too much profit on the last contract; therefore, the next contract must be structured to prevent this from happening again.
Government Purchasing	<p>While these attitudes may be understandable in a personal sense, they are not valid in Government purchasing because:</p> <ul style="list-style-type: none">• buyers and sellers do not have perfect knowledge of all transactions between a contractor and the Government• the market forces of competition, supply, and demand change• business conditions change
Conclusion	Thus, you must price each contract separately and independently to ensure that all proposed prices are fair and reasonable to all involved parties.

I.4.3 Exclude Contingencies



Introduction In Government purchasing, part of the Government's total pricing objective is NOT to include, in a contract price, any amount for a specified contingency, if the occurrence or effect of the contingency cannot be equitably priced at the time of contract award.

Definition: Contingency A **contingency** is a possible future event or condition arising from presently known or unknown causes, the outcome of which is NOT determinable at the present time.

Types of Contingencies You should be aware of the two types of contingencies that are important in Government purchasing:

- Contingencies whose effects can be reasonably estimated within acceptable limits of accuracy
- Contingencies whose effects cannot be reasonably estimated equitably

Pricing Decision This table shows you how to handle each type of contingency in terms of the contract price:

CONTINGENCY	EXAMPLES	CONTRACT PRICE
Effect can be reasonably estimated	<ul style="list-style-type: none"> • Cost of rejects • Cost of defective work 	Effects should be included in contract price
Effect CANNOT be reasonably estimated	<ul style="list-style-type: none"> • Winning or losing a lawsuit • Costs affected by court decision 	Effects MUST be excluded from contract price and disclosed separately to permit negotiation of acceptable contract coverage

I.5 Market Environment Effect on Pricing

Introduction

Both the seller's and buyer's perspectives of price reasonableness are affected by the market prices. When price competition exists, the forces of supply and demand effectively determine what price is reasonable. When effective price competition does NOT exist, either the buyer or the seller will have greater power to control the market price.

Markets Classified by Degrees of Competition

LEVEL	BUYERS	SELLERS	PRODUCTS	MARKET ENTRY/EXIT
Perfect Competition	many independent	many independent	homogeneous interchangeable	relatively easy
Adequate Competition	limited independent	limited independent	relatively homogeneous interchangeable	relatively easy
Oligopoly	many independent	few independent	increased product differentiation	restrictions
Oligopsony	few independent	many independent	relatively homogeneous interchangeable	relatively easy
Monopoly	many independent	one	highly differentiated	restrictions
Monopsony	one	many independent	relatively homogeneous	relatively easy
Bilateral Monopoly	one	one	differentiated	restrictions

Pricing Power and Market Situations

Your relative power compared to that of sellers changes in different market situations. The table below presents seven different levels of competition:

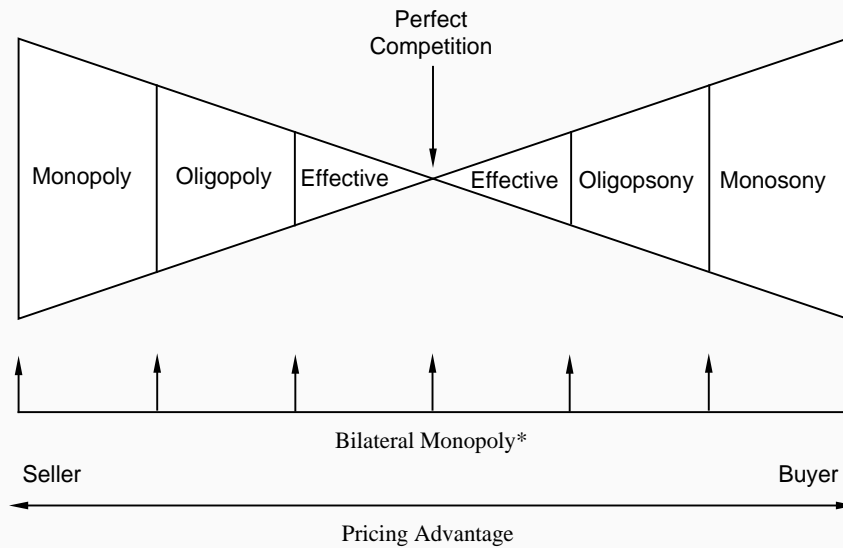
MARKET	PRICING ADVANTAGE
Perfect Competition	Pricing balance between buyers and sellers
Adequate Competition	Relative pricing balance between buyers and sellers
Oligopoly	Relatively greater pricing power to the seller
Oligopsony	Relatively greater pricing power to the buyer
Monopoly	Considerable pricing power to the seller
Monopsony	Considerable pricing power to the buyer
Bilateral Monopoly	Pricing power established by negotiation (as in sole source government negotiations)

(continued on next page)

I.6 Market Environment Effect on Pricing (continued)

Relative
Pricing Power

This diagram shows the relative pricing power in each market.



*Relative pricing power established by need and negotiation ability

Need for Cost
Data

As a buyer, you should be increasingly concerned as pricing advantage shifts to the seller. You will no longer be able to rely on market forces to set a reasonable price. As their market power increases, sellers will rely increasingly on cost-based pricing. The seller's cost-based price will become the market price. To effectively determine price reasonableness, you will need both knowledge and understanding of seller costs.

I.9 Participants in Cost Analysis

Participants Understanding and analyzing contractor costs is NOT a one-person job. It requires the cooperative effort of many specialists. All participants bring a valuable perspective to the analysis task.

For large procurements, the analysis group may be large and have a very formal structure. For smaller purchases, the group may be smaller and more informal.

The analysis participants make use of several methods to correlate their various perspectives. They may have face-to-face meetings, perform written reviews, or make quick telephone calls.

Participants' Roles This table shows the roles and functional responsibilities of several typical participants in cost analysis:

TEAM MEMBER	ROLES/RESPONSIBILITIES
Procuring Contracting Officer/Contract Negotiator	<ul style="list-style-type: none"> Key participants Contracting Officer has authority to obligate the Government to a contract. The Contract Negotiator represents the CO in making key pricing decisions.
Requirement/Program/Project Manager	<ul style="list-style-type: none"> Controls the flow of purchase requirements to contracting office. Evaluates government requirements, relationships between purchase requirements, and funding availability.
User	<ul style="list-style-type: none"> Knows what a product or service must do. Identifies unnecessary costs that may not be obvious to others not as familiar with the product.
Technical Specialists	<p>Example: engineers</p> <ul style="list-style-type: none"> Evaluates offeror costs against known data on the most efficient and effective technical approaches for contract completion.
Financial Specialists	<p>Examples: auditors, price analysts, budget specialists</p> <ul style="list-style-type: none"> Analyzes financial aspects affecting contract costs. Auditor is particularly important because of right of access to offeror's accounting records.
Contract Administration Specialists	<ul style="list-style-type: none"> Monitors contract performance and offer operations in terms of contractual, technical and financial factors.
Legal Specialists	<ul style="list-style-type: none"> Evaluates legal requirements and prohibitions that can affect contract cost and price.

Chapter Vignette

Andrew's First Cost Analysis

As Andrew sat at his new desk, he felt proud of his career improvement. He had been a procurement assistant going to college part-time, and now he had finished his degree and was selected for a developmental buyer position. While proud of his accomplishments, he was concerned about his lack of experience and knowledge. Kay, Andrew's supervisor and Contracting Officer, had told him not to worry about his lack of experience. "We will show you what you need to know, and you will be attending professional continuing education classes that will teach you the basics," she had said. In the meantime, Kay had given Andrew materials to review on various subjects relating to reviewing and negotiating contracts. The first stack of materials dealt with cost and cost analysis, allowability, data collection, cost or pricing data, work design & analysis, and analytical techniques. She had told him that after he had reviewed the materials,, he would be given a real proposal to review and negotiate with assistance from herself and another buyer.

Andrew picked up the folder marked "costs and cost analysis." He thought to himself that this would be a good starting point since he wasn't really sure what these terms meant.

Course Learning Objectives

At the end of this chapter, you will be able to:

- Define contract price as used in contract pricing
- Identify the elements of price analysis
- Identify the elements of cost analysis
- Identify the major sources of information and types of information used in planning for cost analysis
- Identify the relationship between cost estimating and cost accounting
- Identify cost estimating methods

Chapter Overview

Introduction	<p>This chapter lays the basis for studying Cost Analysis by:</p> <ul style="list-style-type: none"> • defining cost as it applies to acquisition in general, and contract cost in particular • reviewing price analysis and cost analysis to distinguish their different purposes, yet show their relationship • presenting general steps and sources of information for initiating a cost analysis
--------------	---

Maps in this Chapter	<p>This chapter includes:</p> <p>1.1 COST 1-5</p> <p>1.1.1 The Meaning of “Cost” 1-7</p> <p>1.1.2 Contract Cost 1-8</p> <p>1.2 PRICE AND COST ANALYSES 1-9</p> <p>1.2.1 • Price Analysis 1-10</p> <p>1.2.2 Bases of Price Analysis 1-11</p> <p>1.2.3 Cost Analysis 1-12</p> <p>1.3 PLANNING FOR COST ANALYSIS 1-13</p> <p>1.3.1 Planning for Cost Analysis 1-14</p> <p>1.3.2 Relationship between Cost Estimating and Cost Accounting 1-16</p> <p>1.3.3 Cost Estimating Principles and Methods 1-20</p>
----------------------	--

Chapter Overview
(continued)

1.1 COST

Section Overview

Overview	<p>In this section, you will examine the meaning of “cost” and “contract cost.” You will see that “cost” has several definitions in Government acquisition.</p> <p>The definition that this course is most concerned with is “contract cost.” Therefore, contract cost is further broken down into its component costs.</p>
----------	---

Maps in this section	<p>This section includes:</p> <ul style="list-style-type: none">• The Meaning of “Cost”• Contract Cost
----------------------	---

1.1.1 The Meaning of “Cost”

Introduction	The word “cost” has many uses in Government acquisition. Each type of cost has a special and unique meaning.
--------------	--

Types of Costs FAR 15.801	Price (Acquisition Cost) — all contract costs plus contract profit involved in the acquisition of a supply or service.
------------------------------	---

FAR 31.201-1	Contract Cost — the sum of the allowable direct and indirect costs allocable to a particular contract, incurred or to be incurred, less any allocable credits, plus any applicable cost of money.
--------------	--

FAR 31.202	Direct Cost — any cost that can be identified specifically with a particular contract (or other such final cost objective). Suppose, for example, your work requires 5,000 tons of steel. The contractor would classify the cost of that steel as a direct cost and charge the entire amount against your contract.
------------	--

FAR 31.203	Indirect Cost — any cost NOT directly identified with a single contract but identified with two or more contracts or other intermediate cost objectives. After the contractor has charged all direct costs to contracts, the contractor “allocates” (i.e., divides) indirect costs between the contracts with which they are identified. Suppose, for example, a contractor is simultaneously working on two contracts in the same building. The contractor would probably classify rent for that building as an indirect cost. Hence, the contractor would have to fairly divide the dollar amount of the rent between the two contracts.
------------	---

For reasons of practicality, contractors also may treat any direct cost of minor dollar amount as an indirect cost — if the treatment is consistently applied and produces substantially the same results as direct cost treatment.

In this course, cost analysis means analysis of the basic cost building blocks: direct and indirect costs.

(continued on next page)

1.1.1 The Meaning of “Cost”

(continued)

Life Cycle Costs

Life Cycle Cost — the total cost of an item or system over its full life. It includes the cost of development, production, ownership and, where applicable, disposal.

Development Cost — all costs, including acquisition contract costs, associated with the research and development needed to produce an operational item or system.

Production Cost — all acquisition contract costs, associated with the production of an item or system.

Operation and Maintenance Cost — all costs, including acquisition contract costs, associated with equipment, supplies, and services needed to operate, and maintain an operational system.

Disposal Cost — all costs, including acquisition contract costs, associated with removing operational equipment from services and disposing of it.

$$\begin{array}{|c|} \hline \text{Development} \\ \text{Cost} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Production} \\ \text{Cost} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Operation and} \\ \text{Maintenance} \\ \text{Cost} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Disposal} \\ \text{Cost} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Life Cycle} \\ \text{Cost} \\ \hline \end{array}$$

1.1.2 Contract Costs

Introduction

FAR 31.201-1

Not all contract costs result from cash expenditures during the contract period. For example, both direct and indirect costs can result from a draw down of inventory, and many indirect costs are accrual expenses.

Definitions

Cash expenditure—the actual outlay or dollars in exchange for goods and services.

Expense accrual—expenses are recorded for accounting purposes when the obligation is incurred, regardless of when cash is paid out for the goods or services.

Draw down of inventory—the use of goods purchased and held in stock for production and/or direct sale to customers; refers to both the number of units and the dollar amount of items drawn out.

Examples

TYPE OF CONTRACT COST	EXAMPLE
Cash expenditure	the payment by cash or check, electronic funds transfer to a vendor for raw materials.
Expense accrual	the incurring of an obligation in the current year to pay an employee a retirement pension at some point in the future.
Draw down of inventory	electronic components purchased in large volume against anticipated total demand and held in inventory until drawn out to fill a specific order. While the components were paid for in the past, the drawing out of a component to meet a contract need is a contract cost.

1.2 PRICE AND COST ANALYSES

Section Overview

Overview	<p>In this section, you will cover:</p> <ul style="list-style-type: none">• definition of Price Analysis• when to use Price Analysis• bases for performing a Price Analysis• definition of Cost Analysis• when to use Cost Analysis• techniques used in Cost Analysis
Price Analysis	<p>The material covered here on Price Analysis is probably a review of material that you covered in the course on Price Analysis. It is included to give a brief “refresher” of this basic information and a common perspective of Price Analysis for the rest of this course.</p>
Cost Analysis	<p>This material introduces Cost Analysis with its definition and conditions for using Cost Analysis is used.</p>
Maps in this Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Price Analysis• Bases of Price Analysis• Cost Analysis

1.2.1 Price Analysis

Definition	Price analysis is the process of examining and evaluating a proposed price to determine if it is fair and reasonable without evaluating its separate cost elements and proposed profit.
FAR 15.805-2	

When to use Price analysis	A price analysis should be performed for all acquisitions, whether or not a cost analysis is required.
-------------------------------	---

Price Analysis in conjunction with Cost Analysis	<p>Price analysis is required even when a cost analysis is performed because assuring the reasonableness of individual elements of cost does NOT always ensure price reasonableness.</p> <p>Example: Suppose that you wanted to purchase a custom-made automobile identical to a Chevrolet Caprice. You go to your neighborhood mechanic and ask him to build a car for you, and he agrees. In building the car, he gets competitive quotes on all the parts and necessary tooling. He pays minimum wage to all his workers. He asks only a very small profit because he enjoys the challenge.</p> <p>How do you think the final price will compare to a car off an assembly line? Probably at least ten times more expensive. Parts alone may be five times more expensive. The entire cost of tooling will be charged to one car. Labor, although cheaper, will likely not be as efficient as assembly-line labor. Is the price reasonable? That decision can only be made through a thorough price analysis.</p>
---	--

1.2.2 Bases of Price Analysis

Introduction There are several sources of price information upon which one can base a price analysis. They are not all equally reliable; therefore, some are preferable to others. They are NOT all equally reliable: therefore, you need to decide which one(s) best fit your particular situation.

The types of comparisons that you make depend mostly on the available data. For instance, if you have data on historical prices and have reason to believe that these data reflect good prior decisions on price reasonableness, then compare the low offer to historical prices. If you have no historical data (or have reason to believe that the historical prices were not reasonable), then give little or no weight to historical prices as a basis for comparison.

Bases for Price Analysis Certain bases for price analysis may be used to determine price reasonableness for purchases.

FAR 15.805-2

- Comparison of proposed prices from more than one offeror
 - Commercial prices for the same or similar items, including both published prices (e.g., catalog prices) **and** prices identified through market research
 - Comparison of proposed prices with prior prices for the same or similar items
 - Comparison of proposed prices with rough yardsticks or cost estimating relationships, such as price per pound, price per inch, or price per horsepower, to highlight inconsistencies that would warrant further review
 - Comparison of proposed prices with independent Government cost estimates
-

1.2.3 Cost Analysis

Definition

Cost analysis is the systematic review and evaluation of the individual cost elements and profit/fee that, when added together, constitute contract price.

FAR 15.805-3

When to Use Cost Analysis

Cost analysis is used for contract actions where price CANNOT be determined as fair and reasonable using price analysis alone.

TYPE OF CONTRACT ACTION	SITUATIONS WITHOUT ADEQUATE PRICE COMPETITION	COST ANALYSIS IS MANDATORY WHEN:	COST ANALYSIS IS OPTIONAL WHEN
New Purchases	Sole Source Purchase Single Source Purchases Competition Immune Source Non-price Competition	<ul style="list-style-type: none"> Certified cost or pricing data are required <p>AND</p> <ul style="list-style-type: none"> No exemption applies (See Chapter 2)	Contracting officer determines that the pricing decision CANNOT be based on price analysis alone
Contract Modification	Any contract modification regardless of whether the original contract resulted from price competition	<ul style="list-style-type: none"> Certified cost or pricing data are required <p>AND</p> <ul style="list-style-type: none"> No exemption applies (See Chapter 2)	Contracting officer determines that the pricing decision CANNOT be based on price analysis alone

1.3 PLANNING FOR COST ANALYSIS

Section Overview

Overview	<p>In this section you will cover:</p> <ul style="list-style-type: none">• three general steps in approaching a cost analysis, including the sources of information to be reviewed• the relationship between cost estimating and cost accounting• cost estimating principles and methods
Planning for Cost Analysis	<p>This map sets forth the basic documents and information to review as a basis for a cost analysis.</p>
Maps in this Section	<ul style="list-style-type: none">• Planning for Cost Analysis• Relationship between Cost Estimating and Cost Accounting• Cost Estimating Principles and Methods

1.3.1 Planning for Cost Analysis

Introduction

FAR 15.803

Planning for cost analysis is as important as any plan of action before starting a project. Specific cost analysis techniques will be discussed in later chapters.

Initial Sources of Information

Initial sources of information for the cost analysis include the:

- Statement of Work
- Request for Proposals
- Program/project history
- Procurement history
- Proposal technical structure
- Proposal cost structure

Procedure

The following table shows the initial steps in reviewing these documents.

STEP	ACTION
1. Review contract requirements	Review specification/statement of work (SOW). The best source of information on what the offeror will be required to do by the contract is the specification and/or SOW. It is vital that you understand what is required so that you can identify any differences between what is required and what is proposed.
	Review Request for Proposals (RFP). The Request for Proposals (RFP) is the best source of information on contract terms such as payment, packaging and delivery. You must understand these terms to determine if the offeror's proposal is consistent with the government's requirements. For example, if the offeror is proposing delivery 12 months after receipt of order, and the Government needs the products 6 months after receipt of order, then the difference in deliveries must be addressed immediately.

(table continues on next page)

1.3.1 Planning for Cost Analysis (continued)

Procedure
(continued)

Continuation of the table.

STEP	ACTION
2. Review history	Review program/project history. It is important to understand how the current procurement fits into the overall program. Program/project history records can reveal many factors that may affect price.
	Review procurement history. This can reveal useful information on pricing practices, access to data problems, and general track record of proposal quality.
3. Review contractor proposal	Review technical structure. Compare the technical structure of the offeror's proposal with the requirements in the specification/SOW to assure that all requirements are met and no unnecessary elements are included.
	Review cost structure. The offeror's proposal will only make sense if the cost estimating structure is consistent with the way the accounting structure accumulates costs. For example, if direct labor is proposed by individual job order, then any cost history used would need to be presented on a job order basis. The best source of information on the offeror's consistency with estimating and accounting systems is the Government audit report.

(end of table)

1.3.2 Relationship between Cost Estimating and Cost Accounting

Cost Estimating System

An offeror's estimating system is the policies, procedures, and practices for estimating the probable costs of future work. Estimates may be based on factual data, such as accounting records of costs on prior projects. Estimates are also predicated on judgements about such things as:

- The cost impact of changes in specifications and other requirements.
- How the work should be organized and performed (which may or may not differ from how the work was done in the past).
- Risks inherent in the work and potential performance problems.
- External factors that might impact performance costs in upcoming periods, such as probable changes in market conditions, total sales by the firm, the value of the dollar, laws, and the like.

Functions. Contractors use estimating systems to:

- Prepare budgets and financial forecasts.
 - Determine capital requirements.
 - Make product, production, and investment decisions.
 - Price products.
 - Prepare bids and proposals.
-

Cost Accounting System

Definition. The cost accounting system is a firm's policies, procedures and practices for (1) recording, (2) verifying, (3) accumulating, and (4) allocating costs incurred by the firm.

Functions. Contractors use accounting systems to:

- Monitor and report incurred costs.
 - Bill costs.
 - Control costs.
 - Measure the performance of managers.
 - Obtain data on incurred costs as a basis for estimating future costs.
-

(topic continued on next page)

1.3.2 Relationship between Cost Estimating and Cost Accounting

(continued)

Job Order Accounting

Job order cost systems are ones in which the contractor accounts for output by specifically identifiable physical units. The costs for each job or contract normally will be accumulated under separate job orders. A job order may cover the production of one unit or a number of identical units. If the contract is for just one unit, the entire actual cost of the unit is accumulated under the job order. An example might be a contract for one large ship.

When the contract is for items that are both complex and costly, the total quantity may be broken down into smaller production lots. The job order for the total contract may be supported by a separate job order for each lot. For example, if the contract is for five nuclear submarines, five separate lots may be established to accumulate the actual cost of each submarine. The use of lots permits the contractor to establish better control over the work, and the historical cost data from a series of lots lend themselves to a projection of estimated costs for future production.

When the contract is for a limited number of units that are neither very complex nor costly, the costs of all units may be accumulated under one job order without any further breakdown by lots.

Experience with the product normally determines the number of units for which costs are to be accumulated. For example, a contract for 100 units of an item that has never been produced may have 10 separate lots under the job order. Four years and thousands of units later, the costs for a quantity of 100 units may be accumulated under the contract job order without any further breakdown by lot.

Because the physical units of production under a job order cost system are identified with specific job orders and lots, the labor distribution and accumulation system used by the contractor will identify the direct factory labor cost associated with the units produced under such job orders and lots. When a job order or a lot thereunder is completed, the supporting data will identify all persons who worked on the items produced, how much time they expended, and what their rates of pay were. It will yield total labor cost with subtotals and breakdowns by types of labor.

(topic continued on next page)

1.3.2 Relationship between Cost Estimating and Cost Accounting

(continued)

Process Cost Accounting

Process cost systems are used by contractors who continuously manufacture a particular end-item, like aircraft engines or chemicals for which there is a repetition of identical or highly similar processes. A process is one part of a complete set of activities that an item must pass through during manufacture. The completed item results from a series of processes, each of which produces some changes in the material. The number of processes involved will vary with the complexity of the item. The greater the similarity between two end-items, the more likely they are to go through the same process, at the same time, with factory laborers devoting a part of their time to each item.

Under a process cost system, direct costs are charged to a process even though end-items (which may not be identical) for more than one contract are being run through the process at the same time. At the end of the cost accounting period (usually one month), the costs incurred for that process are assigned to the units completed during the period and to the incomplete units still in process.

A number of methods are used to assign costs. If there is only one end-item in the process, the contractor may add the costs incurred during the accounting period to the cost of the beginning work-in-process inventory and subtract the estimated cost of the ending work-in-process inventory to arrive at the total costs of items completed. Unit cost is determined by dividing the total cost by the number of units completed. If more than one item is in the process, the contractor may use standard costs and, at the end of the accounting period, multiply the standard cost for each item by the number of units completed to arrive at a total cost. Variance from standard can be accounted for and assigned to end-items in a number of different ways. For the definition of "standard costs", see chapter 8.

Normally an item will go through more than one process. When an item comes out of one process and enters another, its cost from the process just completed will be charged to the next process, usually as material cost. This continues until the completed end-item emerges from its last process.

(topic continued on next page)

1.3.2 Relationship between Cost Estimating and Cost Accounting

(continued)

Process Cost
Accounting
(continued)

Under a process cost system you may identify which factory employees charged their time to which processes, what their rates of pay were, and the total cost charged to the process. Unlike a job order cost system, you cannot determine the actual labor cost for specific end-items that have gone through a process. However, you generally can add standard cost and a factor for variances and arrive at an acceptably close approximation. Similarly, you cannot determine the actual labor cost for specific end-items that have completed all processes because cost elements lose their identity when they are charged to the next process as material costs.

Relationship

It is important for contracting officers to understand the relationship between the Cost Accounting system and the Cost Estimating system of the offeror. Faults in the Cost Accounting system directly relate to errors in cost estimating and, hence, to defective cost and pricing proposals.

Data from the cost accounting system feeds into the cost estimating system. An ineffective cost accounting system can provide noncurrent, inaccurate, and incomplete data in support of an offeror's proposal. The defective cost data can create inaccurate estimates no matter how well the estimating uses the data provided. However, even with accurate cost data, an estimating system based on improbable assumptions can still create inaccurate estimates.

1.3.3 Cost Estimating Principles and Methods

Introduction

FAR 31.201-1

According to FAR 31.201-1, an offeror may use any generally accepted estimating method that is equitable and consistently applied.

Principles

It is important to understand the principles of cost estimating.

PRINCIPLE	EXPLANATION
Equitable	Any method that results in a fair and reasonable estimation and allocation of a cost element is considered equitable.
Consistently applied	The same equitable method must be applied in similar circumstances throughout the estimate. An offeror cannot pick and choose different methods throughout the estimate to the offeror's own advantage.

Basic Cost Estimating Methods

There are three basic methods for cost estimating.

METHOD	EXPLANATION
Round-Table	Experts are brought together to develop the cost estimates, usually without detailed drawings or a bill of materials, and with limited information on specifications.
Comparison Estimating	Comparison estimating is determining the historical cost of the same or similar item as the one being estimated and adjusting or projecting the historical cost for future production. This comparison may be done at the cost element level or total price level.
Detailed Analysis Estimating	This method is characterized by a <u>thorough review</u> of all components, processes, and assemblies. It is the most accurate of the three methods for estimating the direct cost of production. It is also the most time consuming and expensive.

1.3.3 Cost Estimating Principles and Methods

(continued)

Comparison of
Estimating
Methods

The following table shows a comparison of these three methods.

	METHODS		
	ROUND TABLE	COMPARISON	DETAILED
RELATIVE ACCURACY	Low — because limited data used	Moderate/High —depending on data, technique, and estimator*	High — based on engineering principles
RELATIVE ESTIMATOR CONSISTENCY	Low — different experts give different judgements	Moderate/High — depending on data, technique, and estimator	High — based on uniform principle application
RELATIVE SPEED OF DEVELOPMENT	Fast — little detailed analysis	Moderately Fast — especially with repetitive use	Slow — requires detailed design and analysis cost
RELATIVE DEVELOPMENT COST	Low — fast and little data development cost	Moderate — depending on need for data collection and analysis	High — detailed design and analysis cost
RELATIVE DATA REQUIRED	Low — based on expert judgement	Moderate —only requires historical data	High — requires detailed design and analysis

***Warning:** *this method can project continuation of nonrecurring costs.*

Chapter Vignette

Andrew Learns the Terms

Andrew has been told that he will be working on a radio proposal that is subject to the Truth in Negotiations Act (TINA). Also, some of the subcontract work is subject to TINA flow-down while some other parts of the subcontract work are exempt. What is required? When is it required? And, what about these exemptions? Kay had suggested he review the Federal Acquisition Regulation Part 15.8 and focus on data requirements and the Standard Form 1411.

Course Learning Objectives

At the end of this chapter, you will be able to:

- Obtain from vendors the certified or limited/partial data necessary for cost analysis.
- Determine whether the offeror has properly executed the “Certificate of Current Cost or Pricing Data” (when certification is required) and identify the impact of certifying "defective" data.

Chapter Overview

Overview

In this chapter, you will learn:

- the definition of cost and pricing data
 - when certified data are required and when offerors are exempt from the requirement
 - forms for supplying certified data
 - how to obtain certification
 - the consequences of certifying defective data
 - how to request limited or partial data
-

Maps in this Chapter

This chapter contains the following maps:

2.1 COST OR PRICING DATA	2-4
2.1.1 Cost or Pricing Data	2-5
2.1.2 Determining When Certified Cost or Pricing Data Are Required ..	2-7
2.2 DETERMINE THE APPLICABILITY OF EXEMPTIONS FROM THE REQUIREMENT	2-10
2.2.1 Determining Exemptions from the Requirement.....	2-11
2.2.2 Exemptions Based on Adequate Price Competition.....	2-12
2.2.3 Exemptions Based on Catalog Pricing.....	2-13
2.2.4 Exemptions Based on Market Pricing	2-15
2.2.5 Exemptions Based on Regulated Pricing.....	2-16
2.2.6 Waiver of Data Requirements.....	2-17
2.3 KEY COST PROPOSAL ELEMENTS.....	2-18
2.3.1 Contract Pricing Proposal Cover Sheet.....	2-19
2.3.2 Tailored Data.....	2-25
2.4 CERTIFICATE OF CURRENT COST OR PRICING DATA	2-26
2.4.1 Obtaining Properly Executed Certificate.....	2-27
2.4.2 Elements of a Properly Executed Certificate	2-28
2.4.3 Consequences of Certifying Defective Data.....	2-29
2.4 LIMITED OR PARTIAL DATA.....	2-32

2.1 COST OR PRICING DATA

Section Overview

Overview

This section introduces you to:

- cost and pricing data
 - the general requirements for such data
 - the Truth In Negotiation Act
 - when *certified* cost or pricing data are required
-

Maps in This Section

This Section contains the following maps:

- Cost or Pricing Data
 - Determining When Certified Cost or Pricing Data Are Required
-

2.1.1 Cost or Pricing Data

What Are Cost or Pricing Data?

Cost or pricing data are relevant facts that prudent buyers and sellers would expect to have an impact on price. The extent of data required is based on the contracting officer's need to determine the reasonableness of proposed prices. Beyond the contracting officer's need, laws and regulations require specific submissions and certifications on high dollar negotiated contracts.

You may request uncertified data whenever necessary to validate the reasonableness of the offeror's proposed price. The use of uncertified data is common in both price analysis and cost analysis.

Certified data are data that the company has certified as being current, accurate, and complete as of day, month, and year on which price negotiations concluded and the company reached agreement with the Government on price.

Specifying Data Required from Offeror

FAR 15.804-6

In preparing the solicitation, specify:

- whether cost or pricing data are required
- whether certification of cost or pricing data is required
- the extent of data required (when requesting limited or partial, uncertified data)
- the form that the data submission will take:
 - the medium of submission (hard copy, electronic transmission, computer diskette)
 - cover page requirements
 - SF Form 1411 if certification is anticipated
 - CO prescribed cover page if certification is NOT anticipated

Even if the solicitation failed to require submission of certified data, the contracting officer can require the submission of certified data if later found necessary. After examining the proposals received by the closing date in the Request For Proposals (RFP), for instance, the contracting officer may discover that adequate price competition does not exist, contrary to his/her expectations when the RFP was issued. However, late identification of data requirements may delay award because of the extra time taken by offerors to prepare and submit the necessary data.

(continued on next page)

2.1.1 Cost or Pricing Data

(continued)

Truth In
Negotiation
Act

This Act requires contracting officers to obtain accurate, complete, and current cost or pricing data from contractors. It also provides the Government with a price reduction remedy if a contractor fails to comply. This remedy takes effect when the contractor does NOT submit accurate, complete, and current data for a contract and the Government relied on the “defective data” in determining the contract price. The purpose of the Act is to put the Government on equal footing with contractors when negotiating noncompetitive or sole-source contracts.

“Complete”
Cost and
Pricing Data

FAR 15.801

... Are **all** facts as of the date of price agreement that prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, NOT judgmental, and are, therefore, verifiable. While they do NOT indicate the accuracy of prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for the judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred. They also include (but are not limited to) such factors as:

- vendor quotations
 - nonrecurring costs
 - information on changes in production methods and in production or purchasing volume
 - data supporting projections of business prospects and objectives and related operations costs
 - unit-cost trends such as those associated with labor efficiency
 - make-or-buy decisions
 - estimating resources to attain business goals
 - information on management decisions that could have a significant bearing on costs
-

2.1.2 Determining When Certified Cost or Pricing Data Are Required

Introduction

FAR
15.804-3(h)

Remember, you can request data for cost analysis even when there is no expectation that the data will eventually be certified as accurate, complete, and current. You may request limited or partial, uncertified data to analyze offers of any dollar amount, but the requested data must be limited to that necessary to determine price reasonableness.

Requiring Certified Cost or Pricing Data

ALWAYS REQUIRE firms to submit and certify cost or pricing data for contract actions expected to exceed the dollar threshold prescribed in the FAR*, UNLESS:

- The contracting officer exempts the offeror from the requirement (as discussed in the next section), or
- The requirement for cost or pricing data is waived, in writing, by the agency head or delegated official.

NEVER REQUIRE certified cost or pricing data for offers at or below the dollar threshold for small purchases in FAR Part 13.

FAR
15.804-2(a)(3)

RARELY require offerors to submit certified cost or pricing data for contract actions expected to exceed the dollar threshold for mandatory submission of certified data. To require certified cost or pricing data for any such action at or below the dollar threshold for mandatory submission, the contracting officer MUST document the file to record:

- A finding that certified data are necessary.
- The facts supporting that finding.
- Approval of the finding at a level above the contracting officer.

Such findings might include the following:

- The firm has been the subject of recent or recurring and significant findings of defective pricing.
- The firm currently has significant deficiencies in its cost estimating system.
- The firm has recently been indicted for, convicted of, or the subject of an administrative or judicial finding of fraud regarding its cost estimating systems or cost accounting practices.

**\$500,000 for DoD, NASA, and the Coast Guard for contracts awarded after December 5, 1990 (and also for contract modifications of contracts awarded prior to that date, if the contract has been modified to include the new dollar threshold). \$100,000 for other agencies.*

(continued on next page)

2.1.2 Determining When Certified Cost or Pricing Data Are Required

(continued)

Requiring Data The following table provides a more detailed description of requirements for cost or pricing data certification:

TYPE OF CONTRACT ACTION	AT OR BELOW SMALL PURCHASE THRESHOLD	BETWEEN THRESHOLDS	ABOVE THE DOLLAR THRESHOLD FOR CERTIFIED DATA *
New contract price proposal, including options priced in the contract	Never	Only if the contracting officer* (1) determines in writing that certified data are necessary, (2) documents facts supporting that conclusion, and (3) obtains higher level approval. *For subcontracts, includes prime contractor or higher tier subcontractor personnel responsible for determining price reasonableness.	YES, unless the contracting officer exempts the offeror from the requirement or the requirement is waived by the agency head or delegated official.
New subcontract price proposal, when cost or pricing data are required of the prime and higher tier subcontractors			
Contract modifications (considering the aggregate impact of price increases and decreases)			YES, unless (1) the contracting officer exempts the contractor from the requirement, (2) the requirement is waived by the agency head or delegated official, or (3) the contracting officer exercises an option priced as part of the original contract
Subcontract modifications (considering the aggregate impact of price increases and decreases) when cost or pricing data are required of the prime and higher tier subcontractors			
Negotiated final pricing actions			YES, for completed cost and incentive contracts
Contract terminations			YES
Partial contract terminations			YES, where the settlement amount and estimate to complete continued portion exceed the dollar threshold.
Final overhead for use in cost and incentive contracts	YES, along with a signed agreement, a certificate is required.		
Negotiated forward pricing rates	NO, a forward pricing agreement is simply an agreement to use agreed to rates and factors. The rates and factors will be certified on individual negotiations requiring certification where the rates and factors are used.		

*\$500,000 for DoD, NASA, and the Coast Guard for contracts awarded after December 5, 1990 (and also for contract modifications of contracts awarded prior to that date, if the contract has been modified to include the new dollar threshold). \$100,000 for other agencies.

2.1.2 Determining When Certified Cost or Pricing Data Are Required

(continued)

Examples

Example 1. The offeror submits proposal for spare parts at a proposed price of \$99,999.99 without supporting data. The offeror feels that NO support is required since the offer is below the threshold for certified cost or pricing data.

The contracting officer can legitimately pursue additional data if in his/her judgement it is necessary to determine the reasonableness of the offeror's price. Further, if the contracting officer feels it is appropriate, the offeror can be required to submit a Certificate of Current Cost or Pricing at the conclusion of negotiations.

Example 2. The offeror submits a proposal for spare parts at a proposed price of \$9,000.00 without supporting data. The offeror feels that NO support is required since the offer is below the threshold for certified cost or pricing data.

Again, the contracting officer can legitimately pursue additional data if in his/her judgement it is necessary to determine the reasonableness of the offeror's price. However, since the proposal is less than \$25,000.00, the contracting officer CANNOT require a Certificate of Current Cost or Pricing Data.

Example 3. An offeror submitted a \$1,000,000.00 proposal. The award was made on a competitive basis with price as a major consideration. Now, the offeror is saying a Certificate of Current Cost or Pricing Data is NOT required.

The proposal exceeds the dollar threshold for the certified data requirement. The offeror appears to be exempt from submitting and certifying cost or pricing data on the basis of "adequate price competition" — which is one of the exemptions discussed in the next section. However, you may still need to request limited or partial data to verify cost realism, as described in Chapter 14.

2.2 DETERMINING APPLICABILITY OF EXEMPTIONS FROM THE REQUIREMENT

Section Overview

Overview	<p>In this section, you will cover the conditions under which exemptions to certified cost or pricing data may be granted:</p> <ul style="list-style-type: none">• adequate price competition• price based on catalog pricing• price based on market pricing• price set by law or regulation• requirements waived <p><i>This chapter provides only a brief overview of each exemption. For more detailed guidance, see the FAI text/reference on “Price Analysis.”</i></p>
Maps in This Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• Determining Exemptions from the Requirement• Exemptions Based On Adequate Price Competition• Exemptions Based On Catalog Pricing• Exemptions Based On Market Pricing• Exemptions Based On Regulated Pricing• Waiver of Data Requirements

2.2.1 Determining Exemptions from the Requirement

Introduction

An exemption to the requirement for certified cost or pricing data may be granted by the contracting officer under circumstances where normal business practices generally ensure fair and reasonable prices.

Usually, if the offeror meets the requirements for an exemption, no certified cost or pricing data would be required and the award would be made on the exempted basis.

However, even if an offeror qualifies for an exemption, the contracting officer MUST still determine if the price is fair and reasonable. Uncertified data may be necessary to support this conclusion.

Conditions Required for Exemption

The following table shows the conditions necessary for exemption:

EXEMPTION	REQUIRED CONDITIONS
Adequate price competence— FAR 15.804-3(b)(1)&(2)	Two or more responsible, responsive offerors competing independently for a contract to be awarded to the responsible offeror with the lowest evaluated price.
“Based on” adequate price competition— FAR 15.804-3(b)(3)	Price analysis alone can establish price reasonableness through comparison with current or recent prices for the same or substantially the same items purchased in comparable quantities, terms, and conditions as a result of adequate price competition, despite absence of direct competition.
Established catalog or market prices— FAR 15.804-3(c)	Prices are based on established catalog or market prices for a commercial item sold in substantial quantities to the general public.
“Based on” catalog or market price— FAR 15.804-3(c)(6)	The item being purchased is sufficiently similar to a commercial item sold in significant quantities to the general public to permit any difference in price between the items to be identified and justified WITHOUT resorting to cost analysis.
Prices set by law or regulation—	Laws, regulations, pronouncements in the form of periodic rulings, review, or similar actions of a government body are sufficient to establish the price.

(continued on next page)

2.2.2 Exemption Based on Adequate Price Competition

Introduction	<hr/> <p>Price competition generally precludes the need for certified data on an offeror's costs, <i>if it is adequate</i>.</p> <hr/>
Requirements for Adequate Price Competition	<p>Adequate price competition exists if ALL of the following required conditions are met:</p> <ul style="list-style-type: none">• Two or more responsive, responsible offerors <p>If there is only one offer, no matter how many were solicited, price competition does NOT exist.</p> <p>If only one offeror is considered to be both responsive and responsible, price competition does NOT exist.</p> <ul style="list-style-type: none">• Two or more acceptable brand names and part numbers <p>If only one brand name and part number is acceptable, offers CANNOT be independent, because all depend on the same manufacturer. Price competition does NOT exist, no matter how many offers are received.</p> <ul style="list-style-type: none">• More than just technical excellence is considered in competition
Comp Gen B-189884	<p>Price competition only exists, if price is a substantial factor in making the award. HOWEVER, in Comptroller General Decision B-189884, adequate price competition was found to exist even though price was assigned a weight of only 20 percent in the award decision.</p> <hr/>
Inadequate Competition	<p>If price competition exists, the contracting officer MUST assume that it is adequate unless:</p> <ul style="list-style-type: none">• The solicitation is made under conditions that unreasonably deny one or more known and qualified offerors the opportunity to compete.• The low offeror has such a decided advantage that it is practically immune from competition.• There is a finding, supported by a statement of the facts and approved at a level above the contracting officer, that the price is unreasonable. <hr/>

2.2.3 Exemption Based Catalog Pricing

Introduction	An offeror may be exempted from submitting Certified Cost or Pricing Data based on catalog pricing only after an exemption is claimed by the offeror and approved by the contracting officer.
--------------	---

Claiming the Exemption	The exemption is claimed using Section I of the Standard Form 1412, CLAIM FOR EXEMPTION FROM SUBMISSION OF CERTIFIED COST OR PRICING DATA.
------------------------	--

Primary Test for Granting an Exemption	<p>The FAR specifies several tests to determine if the exemption should be granted.</p> <p>The primary test is an analysis of sales to determine whether an item is truly sold as a catalog price item:</p>
--	---

1 . Divide sales during the most recently completed sales period into three categories:

- Category A—Sales to the Federal Government
 - Category B—Sales at catalog price to the general public
 - Category C—Other sales to the general public
-

(continued on next page)

2.2.3 Exemption Based Catalog Pricing

(continued)

Primary Test
for Granting
an Exemption
(continued)

2. Compare the different categories of sales to determine the applicability of the exemption:

WHEN ...	
<p>A = Sales to the Federal Government B = Sales at Catalog Price to the General Public C = Other sales to the General Public B + C = All sales to the General Public A + B + C = Total sales</p>	
IF ...	WHEN ...
B + C ≥ 55% of A + B + C and B ≥ 75% of B + C	the catalog pricing exemption usually applies
B + C < 35% of A + B + C or B < 55% of B + C	the catalog pricing exemption rarely applies
B + C ≥ 35%, but < 55% of A + B + C or B ≥ 55%, but < 75% of B + C	further investigation is required

When the percentages indicate that “further investigation is required,” then the contracting officer should analyze the specific situation to determine if an exemption is justified.

Other Tests for
Granting
Exemption

Other tests require the contracting officer to assure that:

- A catalog does exist by obtaining a copy of the catalog or applicable portion thereof.
- The catalog is the one currently used by the offeror.
- The sales history presented represents substantial quantities, sufficient to establish a real market. Nominal quantities such as models, samples, prototypes, or experimental units do NOT meet this requirement.

2.2.4 Exemption Based on Market Pricing

Introduction	An offeror may be exempted from submitting Certified Cost or Pricing Data based on market pricing only after an exemption is claimed by the offeror and approved by the contracting officer.
--------------	--

Claiming the Exemption	The exemption is claimed using Section II of the Standard Form 1412, CLAIM FOR EXEMPTION FROM SUBMISSION OF CERTIFIED COST OR PRICING DATA.
------------------------	---

The offeror **MUST** set forth the source and date or period of the market quotation or other base for market price, the base amount, and applicable discounts.

Granting the Exemption	<p>In granting the exemption, the contracting officer MUST determine that:</p> <ul style="list-style-type: none">• The quoted market price is established in the usual and ordinary course of trade between buyers and sellers free to bargain.• The price can be substantiated from sources independent of the producer or vendor.• There are sufficient numbers of commercial buyers so that their purchases establish an ascertainable current market price for the item or service.
------------------------	--

The nature of the market should also be considered.

2.2.5 Exemption Based on Regulated Pricing

Introduction	An offeror may be exempted from submitting Certified Cost or Pricing Data based on regulated pricing only after an exemption is claimed by the offeror and approved by the contracting officer.
--------------	---

Claiming the Exemption	The exemption is claimed using Section III of the Standard Form 1412, CLAIM FOR EXEMPTION FROM SUBMISSION OF CERTIFIED COST OR PRICING DATA.
------------------------	--

The offeror **MUST** identify the law or regulation establishing the price offered. If price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, obtain and review a copy of the controlling document from the offeror.

Granting the Exemption	In granting the exemption, the contracting officer MUST review the data submitted by the offeror to determine if the:
------------------------	--

- price of the item or service is set by law or regulation
- law or regulation apply to the specific pricing situation
- proposed price is the current regulated price

If there is any question about the existence or requirements of the law or regulations purported to control pricing, consult your Government attorney for advice and assistance.

2.2.6 Waiver of Data Requirements

Waiving Data Requirements

Waiving Data Requirements Waiver of requirements for certified cost or pricing data in *exceptional cases* is possible. However, the waiver is NOT within the authority of the contracting officer. Only an agency head, or designate, may waive the requirements. This waiver, along with the justifications, MUST be in writing. RARELY ARE WAIVERS GRANTED. They should be considered only in situations where (1) the offeror refuses to submit required data and (2) there is overwhelming evidence that the public interest would be significantly harmed if the waiver is NOT granted.

2.3 KEY COST PROPOSAL ELEMENTS

Section Overview

Overview	<p>A cost proposal, when first submitted, comprises two elements:</p> <ol style="list-style-type: none">1. Contract Pricing Proposal Cover Sheet—SF 14112. Detailed Cost Breakdown and Supporting Data<ul style="list-style-type: none">- Cost or Pricing Data- Offeror's Application of Judgement to the Data <p>This original cost proposal is used during negotiations between the Government and the offeror. Additional data may be submitted during negotiation.</p>
----------	--

Maps in This Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• Contract Pricing Proposal Cover Sheet• Tailored Data
----------------------	--

2.3.1 Contract Pricing Proposal Cover Sheet

Elements of
SF 1411

This table shows the information contained in the contract pricing proposal cover sheet, SF 1411

FIELD	CONTENTS	SF 1411 REFERENCE
Offeror	Name and address of the business entity	2
Contract Type	Is this a fixed price contract or a cost reimbursable-type contract?	5
Cost/Price Information	Prices by line item, with references to proposal location of a detailed cost breakdown and supporting data	8
Administration Information	Names of cognizant contract administration and audit offices	9A & B
Government Support Required	Identifies government furnished property and financing required for contract performance	10 11A & B
Contracts for the same or similar products	Identifies other sales of the same or similar products	12
Compliance with estimating system and FAR Part 31	Offeror's agreement to comply with FAR Part 31, and use any agreed to forward pricing rates	13
Cost Accounting Standards Board (CASB) Data	Identifies whether the proposal is subject to CAS standards, location of government office holding applicable CAS disclosure statement, identified CAS non-compliance issues, and proposal consistency with disclosed accounting practices	14A - D
Signature	Offeror's signature confirming that the proposal reflects the offeror's "best estimates and/or actual costs" as of the proposal date. Grants access to records for audit	17

(continued on next page)

Key Cost Proposal Elements

SF 1411

CONTRACT PRICING PROPOSAL COVER SHEET		1. SOLICITATION/CONTRACT/ MODIFICATION NO.		FORM APPROVED OMB NO. 9000-0013	
NOTE: This form is used in contract actions if submission of cost or pricing data is required. (See FAR 15.804-6(b))					
2. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)		3A. NAME AND TITLE OF OFFEROR'S POINT OF CONTACT		3B. TELEPHONE NO.	
		4. TYPE OF CONTRACT ACTION (Check)			
		A. NEW CONTRACT		D. LETTER CONTR.	
		B. CHANGE ORDER		E. UNPRICED ORDER	
		C. PRICE REVISION/ REDETERMINATION		F. OTHER (Specify)	
5. TYPE OF CONTRACT (Check)		6. PROPOSED COST (A+B=C)			
<input type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (SPECIFY)		A. COST		B. PROFIT/FEE	
		\$		\$	
7. PLACE(S) AND PERIOD(S) OF PERFORMANCE					
8. List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer (Continue on reverse, and then on plain paper, if necessary. Use same headings.)					
A. LINE ITEM #	B. IDENTIFICATION	C. QUANTITY	D. TOTAL \$	E. REF	
9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING (If available)					
A. CONTRACT ADMINISTRATION OFFICE		B. AUDIT OFFICE			
10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? (If "Yes", identify) <input type="checkbox"/> YES <input type="checkbox"/> NO		11A. DO YOU REQUIRE GOVERN - MENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? (If "Yes," complete 11B) <input type="checkbox"/> YES <input type="checkbox"/> NO		11B. TYPE OF FINANCING (√ 1) <input type="checkbox"/> ADVANCED <input type="checkbox"/> PROGRESS PAYMENTS PAYMENTS <input type="checkbox"/> GUARANTEED LOANS	
12. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS? (If "Yes", identify item(s), customer(s) and contract number(s)) <input type="checkbox"/> YES <input type="checkbox"/> NO		13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING PRACTICES AND PROCEDURES AND FAR PART 31 COST PRINCIPLES? (If "No", explain) <input type="checkbox"/> YES <input type="checkbox"/> NO			
14. COST ACCOUNTING STANDARDS BOARD (CASB) DATA (Public Law 91-379 as amended and FAR PART 30)					
A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? (If "No," explain in proposal) <input type="checkbox"/> YES <input type="checkbox"/> NO		B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS-1 OR 2)? (If "Yes," specify in proposal the office to which submitted and if determine to be adequate) <input type="checkbox"/> YES <input type="checkbox"/> NO			
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NON COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal) <input type="checkbox"/> YES <input type="checkbox"/> NO		D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal) <input type="checkbox"/> YES <input type="checkbox"/> NO			
This proposal is submitted in response to the RFP, contract, modification, etc. in Item 1 and reflects our best estimates and/or actual costs as of this date and conforms with the instructions in FAR 15.804-6(b)(2), Table 15-2. By submitting this proposal, the offeror, if selected for negotiation, grants the contracting officer or an authorized representative the right to examine, at any time before award, those books, records, documents and other types of factual information, regardless of form or whether such supporting documentation is specifically referenced or included in the proposal as the basis for pricing, that will permit an adequate evaluation of the proposed price.					
15. NAME AND TITLE (Type)		16. NAME OF FIRM			
17. SIGNATURE				DATE OF SUBMISSION	
NSN 7540-01-142-9845		1411-102		STANDARD FORM 1411 (REV 7-87) Prescribed By GSA FAR (48 CFR) 53.215-2(C)	

TABLE 15-2 Instructions for Submission of a Contract Pricing Proposal

1. SF 1411 provides a vehicle for the offeror to submit to the Government a pricing proposal of estimated and/or incurred costs by contract line item with supporting information, adequately cross-referenced, suitable for detailed analysis. A cost-element breakdown, using the applicable format prescribed in 7A, B, or C below, shall be attached for each proposed line item and must reflect any specific requirements established by the contracting officer. Supporting breakdowns must be furnished for each cost element, consistent with offeror's cost accounting system.

When more than one contract line item is proposed, summary total amounts covering all line items must be furnished for each cost element. If agreement has been reached with Government representatives on use of forward pricing rates/factors, identify the agreement, include a copy, and describe its nature. Depending on offeror's system, breakdowns shall be provided for the following basic elements of cost, as applicable:

Materials—Provide a consolidated priced summary of individual material quantities included in the various tasks, orders, or contract line items being proposed and the basis for pricing (vendor quotes, invoice prices, etc.). Include raw materials, parts, components, assemblies, and services to be produced or performed by others. For all items proposed, identify the item and show the source, quantity, and price.

Competitive Methods—For those acquisitions (e.g., subcontracts, purchase orders, material orders, etc.) exceeding the pertinent threshold set forth at 15.804-2(a)(1) priced on a competitive basis, also provide data showing degree of competition, and the basis for establishing the source and reasonableness of price. For interorganizational transfers priced at other than cost of the comparable competitive commercial work of the division, subsidiary, or affiliate of the contractor, explain the pricing method (see 31.205-26(e)).

Established Catalog or Market Prices/Prices Set by Law or Regulation—When an exemption from the requirement to submit cost or pricing data is claimed, whether the item was produced by others or by the offeror, provide justification for the exemption as required by 15.804-3(e).

Noncompetitive Methods—For those acquisitions (e.g., subcontracts, purchase orders, material orders, etc.) exceeding the pertinent threshold set forth at 15.804-2(a)(1) priced on a noncompetitive basis, also provide data showing the basis for establishing source and reasonableness of price. For standard commercial items fabricated by the offeror that are generally stocked in inventory, provide a separate cost breakdown if priced based on cost. For interorganizational transfers priced at cost, provide a separate breakdown of cost by elements. As required by 15.806-2(a), provide a copy of cost or pricing data submitted by the prospective source in support of each subcontract, or purchase order that is either: (i) \$1,000,000 or more, or (ii) both more than the pertinent threshold set forth at 15.804-2(a)(1)(iii) and (iv) and more than 10 percent of the prime contractor's proposed price. The contracting officer may require submission of cost or pricing data in support of proposals in lower amounts. Submit the results of the analysis of the prospective source's proposal as required by 15.806. When the submission of a prospective source's cost or pricing data is required as described above, it shall be included as part of the offeror's initial pricing proposal.

Direct Labor—Provide a time-phased (e.g., monthly, quarterly, etc.) breakdown of labor hours, rates, and cost by appropriate category, and furnish bases for estimates.

Indirect Costs—Indicate how offeror has computed and applied offeror's indirect costs, including cost breakdowns, and showing trends and budgetary data, to provide a basis for evaluating the reasonableness of proposed rates. Indicate the rates used and provide an appropriate explanation.

Other Costs—List all other costs not otherwise included in the categories described above (e.g., special tooling, travel, computer and consultant services, preservation, packaging and packing, spoilage and rework, and Federal excise tax on finished articles) and provide bases for pricing.

Royalties—If more than \$250, provide the following information on a separate page for each separate royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description (including any part or model numbers of each contract item or component on which the royalty is payable); percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer provide a copy of the current license agreement and identification of applicable claims of specific patents (see Far 27.204 and 31.205-37).

Facilities Capital Cost of Money—When the offeror elects to claim facilities capital cost of money as an allowable cost, the offeror must submit Form CASB-CMF and show the calculation of the proposed amount (see FAR 31.205-10).

2. As part of the specific information required, the offeror must submit with offeror's proposal, and clearly identify as such, cost or pricing data (that is, data that are verifiable and factual and otherwise as defined at FAR 15.801). In addition, submit with offeror's proposal any information reasonably required to explain offeror's estimating process, including—

a. The judgmental factors applied and the mathematical or other methods used in the estimate, including those used in projecting from known data; and

b. the nature and amount of any contingencies included in the proposed price.

3. Whenever the offeror has incurred costs for work performed before submission of proposal, those costs must be identified in the offeror's cost/price proposal.

4. There is a clear distinction between submitting cost or pricing data and merely making available books, records, and other documents without identification. The requirement for submission of cost or pricing data is met when all accurate cost or pricing data reasonably available to the offeror have been submitted, either actually or by specific identification, to the contracting officer or an authorized representative. As later information comes into the offeror's possession, it should be promptly submitted to the contracting officer. The requirement for submission of cost or pricing data continues up to the time of final agreement on price.

5. In submitting offeror's proposal, offeror must include an index, appropriately referenced, of all the cost or pricing data and information accompanying or identified in the proposal. In addition, any future additions and/or revisions, up to the date of agreement on price, must be annotated on a supplemental index.

6. By submitting offeror's proposal, the offeror, if selected for negotiation, grants the contracting officer or an authorized representative the right to examine, at any time before award, those books, records, documents, and other types of factual information, regardless of form or whether such supporting information is specifically referenced or included in the proposal as the basis for pricing, that will permit an adequate evaluation of the proposed price.

7. As soon as practicable after final agreement on price, but before the award resulting from the proposal, the offeror shall, under the conditions stated in FAR 15.804-4, submit a Certificate of Current Cost or Pricing Data.

8. HEADINGS FOR SUBMISSION OF LINE-ITEM SUMMARIES:

A. New Contracts (including letter contracts).

Cost Elements	Proposed Contract Estimate—Total Cost	Proposed Contract Estimate—Unit Cost	Reference
(1)	(2)	(3)	(4)

Under Column (1)—Enter appropriate cost elements.

Under Column (2)—Enter those necessary and reasonable costs that in offeror's judgment will properly be incurred in efficient contract performance. When any of the costs in this column have already been incurred (e.g., under a letter contract or unpriced order), describe them on an attached supporting schedule. When preproduction or startup costs are significant, or when specifically requested to do so by the contracting officer, provide a full identification and explanation of them.

Under Column (3)—Optional, unless required by the contracting officer

Under Column (4)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

B. Change Orders, Modifications, and Claims.

Cost Elements	Estimate Cost of All Work Completed	Cost of Deleted Work Already Performed	Net Cost to Be Deleted	Cost of work Added	Net of Cost of Change	Reference
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Under Column (1)—Enter appropriate cost elements.

Under Column (2)—Include (i) current estimates of what the cost would have been to complete deleted work not yet performed, and (ii) the cost of deleted work already performed.

Under Column (3)—Include the incurred cost of deleted work already performed, actually computed if possible, or estimated in the contractor's accounting records. Attach a detailed inventory of work, materials, parts, components, and hardware already purchased, manufactured, or performed and deleted by the change, indicating the cost and proposed disposition of each line item. Also, if offeror desires to retain these items or any portion of them, indicate the amount offered for them.

Under Column (4)—Enter the net cost to be deleted which is the estimated cost of all deleted work less the cost of deleted work already performed. Column (2) less Column (3) = Column (4).

Under Column (5)—Enter the offeror's estimate for cost of work added by the change. When nonrecurring costs are significant, or when specifically requested to do so by the contracting officer, provide a full identification and explanation of them. When any of the costs in this column have already been incurred, describe them on an attached supporting schedule.

Under Column (6)—Enter the net cost of change which is the cost of work added, less the net cost to be deleted. When this result is negative, place the amount in parentheses. Column (4) less Column (5) = Column (6).

Under Column (7)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

C. Price Revision/Redetermination

Cutoff Date	Number of Units Completed	Number of Unites to be Completed	Contract Amount	Redetermination Proposal Amount	Difference
(1)	(2)	(3)	(4)	(5)	(6)

Cost Elements	Incurred Cost—Preproduction	Incurred Cost—Completed Units	Incurred Cost—Work in Process	Total Incurred Cost	Estimated Cost to Complete	Estimated Total Cost	Reference
(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)

Under Column (1)—Enter the cut off date required by the contract, if applicable.

Under Column (2)—Enter the number of units completed during the period for which experienced costs of production are being submitted.

Under Column (3)—Enter the number of units remaining to be completed under the contract.

Under Column (4)—Enter the cumulative contract amount.

Under Column (5)—Enter the offeror's redetermination proposal amount.

Under Column (6)—Enter the difference between the contract amount and the redetermination proposal amount. When the result is negative, place the amount in parentheses. Column (4) less Column (5) = Column (6).

Under Column (7)—Enter appropriate cost elements. When residual inventory exists, the final costs established under fixed-price-incentive and fixed-price-redeterminable arrangements should be net of the fair market value of such inventory. In support of subcontract costs, submit a listing of all subcontracts subject to repricing action, annotated as to their status.

Under Column (8)—Enter all costs incurred under the contract before starting production and other nonrecurring costs (usually referred to as startup costs) from offeror's books and records as of the cutoff date. These include such costs as preproduction engineering, special plant rearrangement, training program, and any identifiable nonrecurring costs such as initial rework, spoilage, pilot runs, etc. In the event the amounts are not segregated in or otherwise available from offeror's records, enter in this column offeror's best estimates. Explain the basis for each estimate and how the costs are charged on offeror's accounting records (e.g., included in production costs as direct engineering labor, charged to manufacturing overhead, etc.) Also show how the costs would be allocated to the units at their various stages of contract completion.

Under Columns (9) and (10)—Enter in Column (9) the production costs from offeror's books and records (exclusive of preproduction costs reported in Column (8)) of the units completed as of the cutoff date. Enter in Column (10) the costs of work in process as determined from offeror's records or inventories at the cutoff date. When the amounts for work in process are not available in contractor's records but reliable estimates for them can be made, enter the estimated amounts in Column (10) and enter in Column (9) the differences between the total incurred costs (exclusive of preproduction costs) as of the cut-off date and these estimates. Explain the basis for the estimates, including identification of any provision for experienced or anticipated allowances, such as shrinkage, rework, design changes, etc. Furnish experienced unit or lot costs (or labor hours) from inception of contract to the cutoff date, improvement curves, and any other available production cost history pertaining to the item(s) to which offeror's proposal relates.

Under Column (11)—Enter total incurred costs (total of Columns (8), (9), and (10)).

Under Column (12)—Enter those necessary and reasonable costs that in contractor's judgment will properly be incurred in completing the remaining work to be performed under the contract with respect to the item(s) to which contractor's proposal relates.

Under Column (13)—Enter total estimated cost (Total of Columns (11) and (12)).

Under Column (14)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

2.3.2 Tailored Data

Tailoring Data
to Require-
ments

Data submitted using the SF 1411 MUST meet the requirements of FAR, Table 15-2, INSTRUCTIONS OF SUBMISSION OF A CONTRACT PRICING PROPOSAL. When the SF 1411 and data certification are NOT required, data requirements can be tailored even more. You should specify exactly what data are required. Section 7 of FAR Table 15-2 provides examples of tailoring data requirements to a particular purchase action. The examples show a few common situations and are NOT intended to cover every eventuality.

New Work. A complete cost breakdown showing the work needed to complete the job is required.

Change Work. In addition to cost breakdowns for the new or changed tasks, the contractor must provide a cost breakdown for the deleted work to show the removal from the total price of the work that will NOT be performed. Work already completed (actual costs) should be identified. Finally, the net change of work completed, work added, and work deleted should be summarized and cross referenced to other parts of the proposal.

Price Revisions/Redeterminations. Typically, you should see cost breakdowns showing actual cost of work completed, actual cost of work in process (partially completed tasks), and estimates to complete any remaining work. Total proposed cost is the actual cost plus the estimate to complete.

2.4 CERTIFICATE OF CURRENT COST OR PRICING DATA

Section Overview

Overview At times, the cost or pricing data that you require must be certified as current, complete, and accurate.

This section covers:

- when do you need to require a certificate
 - what is required for a properly executed certificate
 - what are the consequences if defective data is certified
-

Maps in This
Section

This section includes the following maps:

- Obtaining Properly Executed certificate
 - Certificate of Current Cost or Pricing Data
 - Elements of a Properly Executed Certificate
 - Consequences of Certifying Defective Data
-

2.4.1 Obtaining a Properly Executed Certificate

Situations Requiring Certificate

FAR 15.804-4

The subsection on *When is a Certificate Required?* shows a table describing the situations that require certification (see page 2-9). Those elements should be reviewed whenever there is a question about the requirements for the certificate or the actual text of the certificate required.

Contractor Certifies the Data Provided

In the certification, the offeror certifies that the cost or pricing data submitted in support of the proposal were accurate, complete, and current as of the date the contractor and the Government agreed on a price. **The exact language in FAR 15.804-4 MUST be used. Any variation from the FAR language could potentially invalidate the certification.**

Example: An offeror deleted the last sentence “...includes the cost or pricing data supporting any advance agreements and forward pricing rate agreements between the offeror and the Government that are part of the proposal,” and substituted a statement that the certification covered direct labor hours and direct material dollars. The offeror erroneously thought that forward pricing rate agreements had their own certification. If the Government had accepted the modified certification and the labor or overhead rates had been defective, the Government may have unwittingly invalidated a legitimate defective pricing case.

Documenting Data Received

Many offerors take great care to assure that every piece of data provided is documented. Whenever any document is provided to the Government, such offerors assign an exhibit number to the document and add it to the list of data provided. A copy of this list is then provided with the Certificate as a record of the data provided. Whenever this procedure is used, you must be sure that the list is an accurate record of the data provided. Accepting the list without question indicates agreement that the Government has received all listed data.

2.4.2 Elements of a Properly Executed Certificate

Introduction	<p>In addition to the exact FAR language, a properly executed Certificate of Current cost and Pricing Data must include the following elements:</p> <ul style="list-style-type: none">• identification of the proposal, quotation, request for price adjustment, or other submission involved, giving the appropriate identifying number• date when price negotiations were concluded and price agreement was reached• name of the firm entering into the agreement with the Government• name and signature of the individual signing the certificate on behalf of the firm• title of the individual signing the certificate on behalf of the firm• date of execution of the certificate
--------------	---

Timing	<p>The certificate MUST be executed <i>on or after</i> the date of agreement on price, and before contract award. The certificate is NOT executed at the time of submission of the proposal. Remember, the data are certified as current, complete, and accurate <i>at the time of agreement on price</i>, no matter the date of certificate execution.</p>
--------	---

Judgement	<p>What is the offeror certifying with the Certificate of Current Cost or Pricing Data? The offeror is certifying the currency, accuracy, and completeness of the <i>data...of the facts...being submitted</i>. The certificate does NOT certify the accuracy of the contractor's judgement in making the projections or estimates (educated guesses) of future costs using this data. It applies only to the data upon which the judgement and estimate were based.</p>
-----------	---

Knowledge	<p>The offeror is certifying the currency, accuracy, and completeness of the data to the “best of my knowledge and belief...” <i>as of the time of agreement on price</i>. The offeror <i>cannot</i> certify to knowledge in the future, only what is presently known or should be known.</p>
-----------	---

Generally, it is assumed that if anyone in the offeror's firm knew a pertinent fact, then failure to disclose that fact constitutes defective pricing. One common cause for data not being current, complete, and accurate is the offeror's failure to relay data on subcontract negotiations.

2.4.3 Consequences of Certifying Defective Data

Introduction

A **defective pricing** clause is inserted into a contract whenever certification is required. If any price, including profit or fee, for any purchase action covered by the Certificate, is increased by any significant amount because the data were NOT accurate, complete, or current, the Government is entitled to a price adjustment representative of the amount overpaid, *plus* interest. When calculating such price adjustments, contracting officers must consider:

- The amount that the price increased (which is one reason why proper documentation of your cost analysis, including technical and audit findings and recommendations, is so important).
- The time by which the cost or pricing data became reasonably available to the contractor.
- The extent to which the Government relied upon the defective data.

Examples

This table gives an example for each kind of defective pricing.

DEFECT	EXAMPLE
Noncurrent	Monthly actual costs for last month were available but not provided
Inaccurate	Cost trend analysis used cost history for the wrong part
Incomplete	The past history of vendor prices excluded a recent lower price for the item being procured

Actions on Defective Pricing

The Government is entitled to a price adjustment, including profit or fee, of any significant amount by which the price was increased because of the defective data under the terms of contract clauses set forth in FAR clause 52.215-22, PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA, and FAR clause 52.215-23, PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA—MODIFICATIONS.

(continued on next page)

2.4.3 Consequences of Certifying Defective Data

(continued)

Offsets

What if complete, current, and accurate data suggest that the contractor will be (or has been) underpaid for some costs? You must offset such underpayments against the amount that would be (or has been) overpaid — but only up to the amount of the Government's claimed overpayment.

Allow an offset only in an amount supported by the facts and if the contractor:

- Certifies to the contracting officer that, to the best of its knowledge and belief, it is entitled to the offset in the amount requested, AND
- Proves that the cost or pricing data were available before the date of agreement on price but were not submitted. Such offsets need not be in the same cost groupings.

Do NOT allow an offset if

- The understated data was known by the contractor to be understated when the Certificate of Current Cost or Pricing Data was signed, OR
- The facts demonstrate that the price would not have increased in the amount to be offset even if the available data had been submitted before the date of agreement on price.

General Accounting Office Findings

The following are two findings of defective pricing identified by the General Accounting Office:

Finding 1. Two contracts were found to be overpriced by \$8.4 million because the company did NOT disclose relevant cost or pricing data on 84 of 144 material items. Specifically the company (1) did NOT disclose lower vendor quotations, purchase prices, and subcontract cost analyses, and (2) made other errors that inflated proposed material prices. In addition, another division supplying parts did NOT disclose lower material price information.

Finding 2. A contract was found to be overpriced by \$1 million because the company did NOT disclose lower prices on seven material items. As negotiations were concluding, the material estimating department provided the firm's negotiator a one-page update showing that substantially lower prices had been received on 3 of the 7 items. However, the firm's negotiator did NOT disclose the lower prices to the contracting officer.

(continued on next page)

2.4.3 Consequences of Certifying Defective Data

(continued)

Defrauding the
Government

Finding 2 seems more flagrant than the first. It appears that there was more than a simple failure to communicate. It appears that there was intent to withhold the data. Where there is evidence of intent to **defraud** the Government, the case may be prosecuted as a fraud case rather than defective pricing.

In addition, many government auditors consider repetitive defective pricing findings in the same firm as an indicator of fraud. Thus repetitive defective pricing findings may lead to substantially more intensive audits.

2.4 LIMITED OR PARTIAL DATA

When needed	Request limited or partial “uncertified” cost data whenever you require such data to determine whether an offered price is fair and reasonable. You may especially need such data for offers at or below the dollar threshold for mandatory submission of certified cost or pricing data, when:
-------------	---

- Negotiating the acquisition of a non-commercial item with a sole source vendor.
 - Negotiating a modification to a non-commercial item.
-

Requesting
Limited or
Partial Data

Whenever you ask a vendor to submit an limited or partial data, you must decide the extent of cost or pricing data to request. Limit your request to those facts necessary to determine price reasonableness. Specify the scope and extent of data requirements in the RFP.

FAR 15.804-6(a)

For example, suppose you are buying a study from a sole source vendor. You expect that material costs will be insignificant to total price. You have a copy of a Forward Pricing Rate Agreement (FPRA) with the firm, under which the firm has agreed to use the negotiated indirect rates (all of which are based on direct labor hours) in preparing proposals. Given these facts, you might request:

- A task by task breakdown of work to be performed.
 - For each task, a breakdown of labor hours and costs by labor category.
 - A list of proposed trips, detailing the expected travel costs of each trip.
 - A total figure for all direct material costs, with no further breakdown of those costs.
 - A total figure for all other direct costs, with no further breakdown of those costs.
 - A total figure for indirect costs (along with verification that the firm used indirect rates in the Forward Pricing Rate Agreement to calculate that total).
 - Proposed profit or fee.
-

(continued on next page)

2.4 LIMITED OR PARTIAL DATA

(continued)

Requesting
Limited or
Partial Data
(continued)

After reviewing the data, you may ask the offeror to justify the totals for direct material or other direct costs if either of those figures is out of line (as percentages of total cost) with totals on prior contracts. You may also request further data as necessary to reach a conclusion on price reasonableness.

Verifying Cost
Realism

You might also request limited or partial data to verify cost realism in competitive procurements, especially when awarding a cost reimbursable contract. For example, you may wish to verify that the low offeror properly considered all specification requirements in estimating the total cost. In this case, you might request data on direct labor and material costs, but NOT on other direct costs, indirect costs, or profit. Carefully tailor the data request to obtain all necessary data and NO other data. See Chapter 14 for more information.

Chapter Vignette

Andrew Learns the Terms

While talking with Kay and the other buyers about costs, several terms kept coming up; terms like, “allowable,” “reasonable,” “allocable,” GAAP,” “CAS,” and “cost principles.” Andrew decided it must be time to pick up the second folder, marked “Accounting Practices & Standards,” so that he could understand what everyone was talking about!

Course Learning Objectives

At the end of this chapter, you will be able to:

- identify general cost principles on allowability
- determine the allowability of several specific cost principles

Chapter Overview

Overview	This chapter presents the concept of “allowability”. When establishing prenegotiation positions on elements of cost, only count costs that are “allowable.”
Maps in this Chapter	<p>This chapter includes the following maps:</p> <p>3.1 GENERAL COST PRINCIPLES ON ALLOWABILITY.....3-5</p> <p>3.1.1 Allowability.....3-6</p> <p>3.1.2 Reasonableness.....3-7</p> <p>3.1.3 Allocability..... 3-10</p> <p>3.1.4 Accounting Practices and Standards 3-12</p> <p>3.1.5 Contract Terms 3-17</p> <p>SPECIFIC COST PRINCIPLES 3-18</p> <p>3.2.1 Specific Cost Principles 3-19</p> <p>3.2.2 Table of Cost Principles..... 3-21</p> <p>3.2.3 Identifying Unallowable Costs 3-24</p> <p>3.2.4 Applying Selected Cost Principles 3-26</p>

Allowability

Chapter Overview

3.1 GENERAL COST PRINCIPLES ON ALLOWABILITY

Section Overview

Overview	This section looks at the general factors in determining whether a proposed cost is allowable.
----------	--

Maps in This Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• Allowability• Reasonableness• Allocability• Accounting Practices and Standards• Specific Cost Principles
----------------------	---

3.1.1 Allowability

Definition	Allowability is the determination that a cost can be properly charged to a contract. A cost is considered allowable if it is: reasonable; NOT expressly or by mutual agreement of the contracting parties declared unallowable; properly accounted for under applicable accounting standards, practices, and principles; and properly assigned either directly or by allocation to a contract. If a cost is allowable, it may be included in a contract cost estimate or charged to a Government contract.
------------	--

Factors Determining Allowability	Factors considered in determining cost allowability are: <ul style="list-style-type: none">• Reasonableness• Allocability• Accounting practices and standards• Applicable cost principles• Terms of the contract
--	--

Applications of Factors	<p>The accounting practices and standards, applicable cost principles, terms of the contract, reasonableness and allocability of the cost, are all considered when determining whether a cost is allowable and can be properly charged to a contract.</p> <p>However, these factors are complex and require careful judgement when determining allowability. Some of these factors supersede others and take precedence when there is a conflict. For example, cost principles generally overrule terms of a contract.</p>
----------------------------	--

Determining Allowability	Determining cost allowability can be tricky and requires a thorough understanding of all of these factors. For guidance in determining the allowability of a cost, consult the Federal Acquisition Regulation (FAR), the responsible, or cognizant, auditor, and the cognizant administrative contracting officer. Ultimately, the contracting officer has the final responsibility for determining the allowability of a particular cost.
-----------------------------	---

3.1.2 Reasonableness

Definition	A cost is reasonable if, in its nature and amount, it does not exceed what a prudent person in the conduct of competitive business would pay.
------------	---

Underlying Assumption	The underlying assumption in this definition is that an offeror will minimize unnecessary costs in order to remain competitive; if the offeror does not do this, then the competition will under bid and take away market share.
-----------------------	--

When competition Is Inadequate	Cost analysis is normally performed in an environment where competition is inadequate for price determination. Therefore, the objective of cost analysis is to determine what the reasonable cost would be if the offeror were in a competitive environment.
--------------------------------	--

Actual Incurred Costs	Both proposed costs and actual incurred costs are subject to the tests of reasonableness. The offeror MUST demonstrate the reasonableness of an incurred cost, and CANNOT simply state that, because the expense has been incurred, it is automatically reasonable.
-----------------------	---

Determining Reasonableness	There are four questions you can ask that will assist you in determining cost reasonableness. <i>Bear in mind that these questions are indicators of possible problems, and may lead you to further investigative questioning.</i>
----------------------------	--

1. *Is the type of cost generally recognized as necessary in conducting business?*

YES: Then it is probably a reasonable cost.

Example: Payment of state and local franchise taxes is a necessary cost of conducting business.

NO: If this cost is not normally necessary, it may be inappropriate for the contract.

Example: The purchase and up-keep of an ocean going yacht for exclusive use of the company president and charging it as employee welfare expense is **NOT** a necessary cost of doing business.

3.1.2 Reasonableness

(continued)

Determining
Reason-
ableness
(continued)

2. *Is the cost consistent with sound business practice, law and regulation, and are purchases conducted on an “arm's-length” basis?*

YES: Then it is probably acceptable.

Example: Construction of a waste treatment plant to comply with environmental standards is consistent with sound practice and law.

NO: If it is inconsistent with sound practice or violates law or regulation, it is probably inappropriate for the contract.

Example: Paying a premium price for materials on a Government contract while receiving a bargain price for the same materials for use on a commercial contract under a “basket” purchase deal is NOT consistent with sound business practice.

3. *Does the offeror's action reflect a responsible attitude toward the Government, other customers, the owners of the business, the employees, and the public-at-large?*

YES: Then the Government's interests are probably being protected.

Example: A good price analysis, and when necessary, cost analysis of supplier proposals prior to awarding purchase orders on Government cost-reimbursable contracts reflects a responsible attitude toward the use of taxpayer dollars.

NO: If the offeror is acting irresponsibly, then the costs are probably excessive and inappropriate.

Example: Excessive salaries to executives and unconscionable retainers for retired executives as consultants is NOT acting responsibly toward the owners of the business or its employees.

(continued on next page)

3.1.2 Reasonableness

(continued)

Determining
Reason-
ableness
(continued)

4. *Are the offeror's actions consistent with established practices?*

YES: Then the Government's interests are probably protected.

Example: The offeror proposed to contract out source inspection of subcontractor parts. Company policy has always required inspection by corporate inspectors. Cost will be reduced and quality standards will be maintained by the proposed subcontractor. It would be reasonable to accept the proposed change.

NO: If the offeror is deviating from established practices, then there is a likelihood that the Government's interests are not protected and costs may be excessive.

Example: The contractor proposes to contract out redesign effort on a modified version of its top product. Company policy and past practice has been to keep all design effort on this product “in-house” due to the proprietary nature of the design and the importance of this product to the company's future. Upon further review, you find that the cost of performing the effort in-house would be substantially less than contracting out. Further, the policy on not releasing design information on this product outside the company is still in force. It would be unreasonable to accept the proposed design cost.

3.1.3 Allocability

Definition	Allocability is the equitable distribution of cost on the basis of the benefit accruing to each cost objective; the greater the benefit received, the greater the charge.
Cost Objectives and Allocability	Typically, we think of cost objectives as individual contracts or jobs. However, cost objectives can also include projects, research, or items produced in lots. Every cost must be allocated among cost objectives <i>in proportion</i> to the benefit received by each cost objective.
Example	An example of a cost that may require allocation is the cost of a typing pool. If the cost of operating a ten-person typing pool is allocated to the users of its services on a cost-per-page basis, it can be said that the user's (cost objectives) portion of the allocated cost is based on the benefit they are receiving—pages of typed copy.
Determining Allocability	<p>There are three questions you can ask that will assist you in determining the appropriateness of cost allocations. <i>Again, bear in mind that these questions are indicators of possible problems, and may lead you to further investigative questioning.</i></p> <p>1. <i>Were the costs specifically incurred for a single cost objective?</i></p> <p>YES: If the costs were incurred for one objective, then the costs should be assigned to that objective and NOT allocated to other non-benefiting objectives.</p> <p>Example: A major subassembly was purchased specifically for use on a Government contract and was properly charged to the Government contract</p> <p>NO: If the costs were incurred for more than one objective, then they are eligible for allocation to all benefiting objectives.</p> <p>Example: General office supplies used throughout the company were incorrectly charged as a direct cost on a Government cost-reimbursable contract</p>

(continued on next page)

3.1.3 Allocability

(continued)

Determining
Allocability
(continued)

2. *If the cost benefits both the contract and other work, were the costs allocated in reasonable proportion to the benefits received?*

YES: If the allocation is proportional, then the cost objective is “paying” its fair share.

Example: A technical typing department proportionately allocates its costs by dividing its total operating costs by the number of pages produced during the year and then charging each job on a rate per page basis.

NO: If the allocation is disproportionate, then the objective is “paying” too little or too much of the cost. Auditors can be very helpful in dealing with this situation.

Example: A maintenance department charges one fourth its costs to each of four departments serviced even though one department accounts for 90% of the work performed by the maintenance department.

3. *Is the allocated cost necessary for overall operation of the business even though a relationship to cost objectives CANNOT be shown?*

YES: Commonly known as General & Administrative expenses, if the costs are necessary in the course of business, then it is assumed that they are of general (overall) benefit to the company.

Example: The salary of the Chief Executive Officer's secretary is a necessary cost of doing business even though the secretary's activities CANNOT be associated with a particular product or portion of the company.

NO: If the cost is NOT necessary for overall operations, then it is not allocable.

Example: The cost of operating a tool crib is identifiable with manufacturing operations and could be charged to manufacturing overhead. Since it is identifiable to a particular part of the company, it should NOT be charged to General & Administrative expense.

3.1.4 Accounting Practices and Standards

Source of
Practice and
Standards

There are three sources of accounting practices and standards that provide guidance on the acceptability of contractor accounting systems (in order of precedence):

- Cost Accounting Standards (CAS)
 - Federal Acquisition Regulation (FAR)
 - Generally Accepted Accounting Principles (GAAP)
-

Cost
Accounting
Standards
(CAS)

Cost Accounting Standards are issued by the Cost Accounting Standards Board (CASB) first established in 1970 when Congress passed Public Law 91-379. When these standards are applicable, they take priority over other forms of accounting guidance.

CAS 401 and 402, the first two standards established, outline the basic concepts of accounting consistency required by CAS. A table listing the 19 Cost Accounting Standards is shown on page 3-15.

The CASB operated as an independent agency of Congress from 1970 until September 30, 1980. Although the CASB stopped operations, the board's rules and 19 Cost Accounting Standards remained in force. In 1990, a new CASB began operation under the Office of Federal Procurement Policy. The new CASB has assumed the responsibilities of the old board.

Cost Accounting Standards (CAS) are reprinted for your convenience in Appendix B of the FAR loose-leaf edition, along with regulations on applying CAS (e.g., on exemptions to CAS and CAS-related requirements for any particular contract action).

Applying CAS

Generally speaking, CAS applies to negotiated contracts and subcontracts over \$500,000. However, many contracts are exempt from CAS coverage. Appendix B lists the exemptions, which are summarized on the next page.

If a contract is subject to CAS, the next question is whether the coverage is “full” or “modified”. Under “modified” coverage, the contractor must comply only with CAS 401, 402, 405, and 406. Under full coverage, the contractor has to comply with all the Standards.

(continued on next page)

3.1.4 Accounting Practices and Standards

(continued)

Exemptions From
Cost Accounting
Standards

BASIS FOR EXEMPTION	THE CONTRACT AND/OR SUBCONTRACT IS EXEMPT IF
Method of Procurement	Awarded through sealed bidding.
Dollar Amount of the Award	The award does not exceed \$500,000. (When determining CAS exemptions, treat an order issued by one segment of a corporation to another as a subcontract.)
Type of Business	With a small business.
	With a labor surplus area concern under a labor surplus area set aside.
	With an educational institution unless the contract or subcontract is to be performed by Federally Funded Research and Development Center.
Method of Pricing	Price is set by law or regulation.
	Price is based on established catalog or market prices of commercial items sold in substantial quantities to the general public.
	Firm fixed-price contracts and subcontracts awarded without submission of any cost data. ¹
Place of Performance	It will be executed and performed entirely outside the United States, its territories, and possessions.
Foreign Concerns	With a foreign government, agent, or instrumentality.
	With a United Kingdom contractor for performance substantially in the United Kingdom (provided that the contractor has filed with the United Kingdom Ministry of Defense, for retention by the ministry, a completed disclosure statement).
	A subcontract under the NATO PHM Ship program to be performed outside the United States by a foreign concern.

¹58 Federal Register page 58801, November 9, 1993.

3.1.4 Accounting Practices and Standards

(continued)

Applying CAS
(continued)

FAR Subpart 30.2

Full coverage applies to CAS covered contracts when the contractor business unit:¹

- Receives a single CAS-covered contract award of \$25 million or more, or
- Has received \$25 million or more in net CAS-covered awards during its preceding cost accounting period, **but only if** at least one contract award exceeded \$1,000,000.

If the contract is subject to “full” CAS coverage, the contractor must disclose existing accounting practices and proposed changes to those practices. The contractor must also comply with all Cost Accounting Standards.

Administrative Contracting Officers (ACOs), with support from auditors, are responsible for:

- Determining the adequacy of contractor disclosure statements,
- Determining whether the accounting practices comply with CAS, and
- Adjusting contract prices if those prices are materially affected by changes in contractor accounting practices for CAS compliance.

Summary of
CAS 401:
Consistency in
Estimating,
Accounting, and
Reporting Costs

Fundamental requirement: A contractor's practices used in estimating costs to price a proposal shall be consistent with its cost accounting practices used in accumulating and reporting costs, **and vice versa**. Otherwise, you would not be able to compare the firm's proposed costs with actual costs incurred on comparable work.

For example, suppose a contractor has submitted separate estimates of engineering labor hours for drafting and production engineering. However, your auditor reports that the contractor's accounting system does not accumulate engineering labor hours by those categories. Instead, the accounting system records hours under a single, undifferentiated title — “engineering labor”. Consequently, you cannot compare proposed drafting hours against actual drafting hours on prior contracts.

Comparisons provide one important basis for financial control over costs during contract performance and aid in establishing accountability for costs in the manner agreed to by both contracting parties. The comparisons also provide an improved basis for evaluating estimating capabilities.

(continued on next page)

¹The CAS Board changed the criteria for full coverage (58 Federal Register page 58801, November 9, 1993). In addition, the CASB Board added Standards 405 and 406 to “modified” coverage.

3.1.4 Accounting Practices and Standards

(continued)

List of Cost
Accounting
Standards

This table lists the Cost Accounting Standards.

COST ACCOUNTING STANDARDS	
CONCEPTS AND PRINCIPLES	
CAS 401	Consistency in Estimating, Accumulating, and Reporting Costs
CAS 402	Consistency in Allocating Costs Incurred for the Same Purpose
CAS 405	Accounting for Unallowables
CAS 406	Cost Accounting Period
ALLOCATION OF COSTS TO CONTRACTS	
CAS 403	Allocation of Home Office Expense
CAS 407	Use of Standard Cost Systems
CAS 410	Allocation of Business Unit G&A
CAS 418	Allocation of Direct and Indirect Costs
IDENTIFICATION & ASSIGNMENT OF COSTS	
CAS 404	Capitalization of Tangible Assets
CAS 409	Depreciation of Tangible Assets
CAS 408	Accounting for Paid Absence
CAS 412	Composition & Measurement of Pension Costs
CAS 413	Adjustment & Allocation of Pension Costs
CAS 415	Accounting for Deferred Compensation
CAS 416	Accounting for Insurance Costs
CAS 411	Accounting for Acquisition Costs of Materials
CAS 420	Accounting for IR&D/B&P
COST OF MONEY	
CAS 414	Cost of Money as an Element of Facilities Capital
CAS 417	Cost of Money of Capital Assets under Construction

(continued on next page)

3.1.4 Accounting Practices and Standards

(continued)

Summary of
CAS 402:
Consistency in
Allocating Costs
Incurred for the
Same Purpose

Fundamental requirement: When allocating costs to final cost objectives (e.g., contracts or products), the contractor may not classify a cost as *indirect* if other costs incurred for the same purpose and in like circumstances have been allocated as *direct* costs, **and vice versa**. In other words, contractors may allocate each type of cost only once, and on only one basis, to any contract or other cost objective — and the criteria for allocating costs should be the same for all similar cost objectives. This standard guards against the overcharging of some cost objectives and helps prevent double counting. Doublecounting occurs most commonly when contractors allocate cost items directly to a contract without eliminating like cost items from indirect cost pools also being charged to the contract.

Summary of
CAS 405: Ac-
counting For
Unallowable
Costs

Fundamental requirement: This standard for the most part reinforces the requirements of FAR 31.201-6 (see page 3-25). In addition, CAS 405 requires contractors to separately account for the costs of any work projects not contractually authorized, in a manner which permits ready separation from the costs of authorized work projects.

Summary of
CAS 406: Cost
Accounting Stan-
dard — Cost
Accounting
Period

Fundamental requirement: The contractor must settle on an accounting period (ordinarily, the firm's fiscal year) and consistently use the same period for accumulating and allocating expenses. Also, CAS 406 generally requires contractors to use the same cost accounting period for accumulating costs in an indirect pool as for establishing its allocation base.

Federal Ac-
quisition
Regulation
(FAR)

The FAR provides additional guidance on cost accounting issues and in some cases incorporates CAS requirements on all contracts whether the offeror is CAS covered or not. Examples of other FAR requirements are the guidelines on cost allocability, and definitions of direct and indirect costs.

Generally Ac-
cepted Ac-
counting Prac-
tices (GAAP)

Generally Accepted Accounting Practices are general rules used by business entities. The GAAP consists of uncodified financial accounting standards established by the Financial Accounting Standards Board or otherwise represented in general or industry practice.. As with other accounting issues, the cognizant Government auditor can be very helpful in answering questions on GAAP coverage.

3.1.5 Contract Terms

Contract
Terms and
Cost Principles

Specific types of cost are often addressed in a contract or Request For Proposal. For example, while transportation costs are allowable, the contract may restrict “allowed” transportation costs to a specific mode, e.g., 3rd class mail. However, the **contract terms can only be more restrictive than the cost principles, not less**. The contract terms CANNOT allow a cost that is unallowable under the cost principles or that violates applicable CAS.

3.2 SPECIFIC COST PRINCIPLES

Section Overview

Overview	<p>This section presents background material necessary for you to use and apply the specific cost principles listed in FAR Part 31.205. The principles are listed here in tabular form showing whether they are allowable, unallowable, or allowable with restrictions. Costs that have been determined strictly unallowable are given special attention.</p>
----------	---

At the end of this section, several exercises are given for you to practice applying specific cost principles. The text of the pertinent FAR material is provided.

Maps in This Section

This section contains the following maps:

- Specific Cost Principles
 - Table of Cost Principles
 - Identifying Unallowable Costs
 - Applying Selected Cost Principles
-

3.2.1 Specific Cost Principles

Introduction	<p>Specific cost principles for contracts with commercial organizations are found in FAR Part 31.205. Currently, there are 51 generally applicable cost principles. The number and wording of these principles continually change to correspond with changes in:</p> <ul style="list-style-type: none"> • business practices (e.g., the large number of business takeovers in the 1980's) • public law (e.g., specific legal prohibitions on lobbying costs) • legal precedents established by the court system and the boards of contract appeals
Purpose	<p>Each cost principle defines a particular type of cost and establishes whether it is allowable, unallowable, or allowable with some restrictions.</p>
Allowable Cost	<p>A cost is allowable, if:</p> <ul style="list-style-type: none"> • it is expressly identified as allowable in the cost principles, and it meets the relevant tests for reasonableness; allocability; proper application of accounting principles, practices, and standards; and terms of the contract <p>or</p> <ul style="list-style-type: none"> • it is not addressed in the cost principles but meets the requirements of the other four tests.
Unallowable Cost	<p>If a cost is deemed unallowable by the above principles and standards, then it is not recognizable on Government contracts either as a proposed cost or a reimbursable expense.</p>
Allowable with Restrictions	<p>If a cost is allowable but with some restrictions, then it is recognizable on Government contracts either as a proposed cost or reimbursable expense up to the stated limit. Consult with the cognizant auditor if there is any question.</p>

3.2.1 Specific Cost Principles

(continued)

Use of Specific Cost Principles

The allowability of a particular cost under cost principles must be determined using **FAR Part 31**. Each principle is based on laws and policies. Additionally, the specific wording and interpretation of a principle is impacted by case law.

FAR Part 31,
especially
Subpart
31.205

Cost principles have been rewritten or added as a result of case law. For example, the cost principle disallowing Goodwill (FAR 31.205-49) was created to address an Armed Services Board of Contract Appeals opinion on a related issued that alluded to the possible recognition of Goodwill as an allowable cost. Goodwill in this case refers to a corporate takeover where the acquiring company pays more for the company it is purchasing than its balance sheet value. The difference between the purchase price and the company's value on paper is called Goodwill and is recognized as an intangible asset. Procurement authorities felt that it was inappropriate for the Government to subsidize corporate takeovers and developed the cost principle expressed in FAR 31.205-49.

Responsibility for Determining Allowability

The decision for determining the allowability of a particular cost ultimately rests with the contracting officer. In making cost principle judgements, you need to work closely with the cognizant administrative contracting officer and auditor.

Guidelines for Using Cost Principles

The following guidelines may be helpful in addressing questions concerning cost principles and their application:

1. In considering the allowability of a particular cost, more than one cost principle may apply. Consider all possible alternative cost principles in your deliberations.
 2. Immediate guidance and assistance can be found from the cognizant auditor.
 3. If questions still exist on proper interpretation or classification of a cost issue, contact your legal counsel.
-

3.2.2 Table of Cost Principles

Cost Principles Table

This table summarizes the current cost principles in FAR Subpart 31.205. A means “allowable”, UA means “unallowable”, and AWR means “allowable with restrictions”. Note that a cost principle may treat some costs that fit the category as “allowable” and other costs that fit the same category as “unallowable”, in which case the table indicates that the principle covers both A and UA costs.

FAR Subpart
31.205

SELECTED COSTS	FAR REF.	A	UA	AWR
ADPE Leasing Costs	31.205-2	A	UA	AWR
Alcoholic Beverages	31.205-51		UA	
Asset Valuations Resulting from Business Combinations	31.205-52			AWR
Bad Debts	31.205-3		UA	
Bonding Costs	31.205-4	A		
Civil Defense Cost	31.205-5	A	UA	
Compensation for Personal Services	31.205-6	A	UA	AWR
Contingencies	31.205-7	A	UA	
Contributions or Donations	31.205-8		UA	
Cost of Money	31.205-10	A		
Deferred Research & Development Costs	31.205-48	A	UA	AWR
Depreciation	31.205-11	A	UA	AWR
Economic Planning Costs	31.205-12	A	UA	
Employee Morale, Health, Welfare, Food Service, & Dormitory Costs & Credits	31.205-13	A		AWR
Entertainment Costs	31.205-14		UA	
Fines, Penalties, & Mischarging	31.205-15		UA	AWR
Gains & Losses on Disposition of Depreciable Property or Other Capital Assets	31.205-16	A		
Goodwill	31.205-49		UA	

(table continued on next two pages)

3.2.2 Table of Cost Principles

(continued)

Cost Principle
Table (cont.)

This table summarizes the current cost principles in FAR Subpart 31.205.

(A = Allowable, UA Unallowable, AWR = Allowable With Restrictions)

FAR Subpart 31.205	SELECTED COSTS	FAR REF.	A	UA	AWR
	Idle Facilities & Idle Capacity Costs	31.205-17	A	UA	AWR
	Insurance & Indemnification	31.205-19	A	UA	AWR
	Interest & Other Financial Cost	31.205-20		UA	
	IR&D/B&P Costs	31.205-18			AWR
	Labor Relations Costs	31.205-21	A		
	Legal & Other Proceedings Costs	31.205-47	A	UA	
	Lobbying Costs (Executive)	31.205-50		UA	
	Lobbying Costs (Legislative)	31.205-22	A	UA	
	Losses on Other Contracts	31.205-23		UA	
	Maintenance & Repair Costs	31.205-24	A		
	Manufacturing & Production Engineer- ing Cost	31.205-25	A		
	Material Costs	31.205-26	A		
	Organization Costs	31.205-27		UA	
	Other Business Expenses	31.205-28	A		
	Plant Protection	31.205-29	A		
	Patent Costs	31.205-30	A	UA	
	Plant Reconversion Costs	31.205-31		UA	AWR
	Precontract Costs	31.205-32	A		
	Professional & Consultant Service Costs	31.205-33	A	UA	
	Public Relations & Advertising	31.205-1	A	UA	AWR

(table continued on next page)

3.2.2 Table of Cost Principles

(continued)

Cost Principle
Table

(continued)

This table summarizes the current cost principles in FAR Subpart 31.205.

(A = Allowable, UA Unallowable, AWR = Allowable With Restrictions)

FAR Subpart 31.205

SELECTED COSTS	FAR REF.	A	UA	AWR
Recruitment Costs	31.205-33	A		
Relocation Costs	31.205-34			AWR
Rental Costs	31.205-35	A		AWR
Reserved	31.205-9			
Royalties & Other Costs for Use of Patents	31.205-36	A		
Selling Costs	31.205-37	A	UA	
Service & Warranty Costs	31.205-38	A		
Special Tooling & Special Test Equipment Cost	31.205-39	A		
Taxes	31.205-40	A	UA	
Termination Costs	31.205-41	A		
Trade, Business, Technical, and Professional Activity Costs	31.205-42	A		
Training & Education Costs	31.205-43	A		AWR
Transportation Costs	31.205-44	A		
Travel Costs	31.205-45			AWR

(end of table)

3.2.3 Identifying Unallowable Costs

Strictly Unallowable Costs

Nine cost categories have been specifically identified as **strictly unallowable**. These are summarized in the table below.

UNALLOWABLE COSTS	REFERENCE
Alcoholic Beverages	31.205-51
Bad Debts	31.205-3
Contributions and Donations	31.205-8
Entertainment Costs	31.205-14
Goodwill	31.205-49
Interest & Other Financial Costs	31.205-20
Lobbying Costs (Executive)	31.205-50
Losses on Other Contracts	31.205-23
Organization Costs	31.205-27

Unallowable under Certain Circumstances

For some other cost categories, allowability is not so clearly defined. A cost may be unallowable under certain circumstances, but allowable, or allowable with restrictions, under other circumstances.

Example 1. Fines and penalties resulting from violations of, or failure to comply with, federal, state, local, or foreign laws and regulations are normally **unallowable** under provisions of FAR 31.205-15, Fines, Penalties, and Mischarging Costs. However, these costs may be **allowable** when incurred as a result of compliance with specific terms and conditions of the contract or written instructions from the contracting officer.

Example 2. Under FAR 31.205-1, Public Relations and Advertising, the cost of responding to inquiries on company policies and activities is **allowable**. The costs of memberships in civic and community organizations are **unallowable**, while costs to promote American aerospace exports at exhibits and air shows are **allowable, except** for hospitality suites and other entertainment.

3.2.3 Identifying Unallowable Costs

(continued)

Accounting for
Unallowable
Costs

FAR 31.201-6

Contractors must identify the following costs and exclude them from the computation of any billing, claim, or proposal applicable to a Government contract.

- Any cost that has been “specifically named and stated to be unallowable” by the express provisions of an applicable law, regulation (e.g., FAR Part 31), or the contract.
- Any cost the parties mutually agree are unallowable (including “directly associated” costs).

Any costs that would not have been incurred if the unallowable cost had not been incurred are known as **directly associated costs** and are also unallowable.

In addition, contractors must identify any costs (including “directly associated” costs) which a contracting officer has specifically disallowed in writing pursuant to contract disputes procedures, if the costs have been included or used in the computation of any billing, claim, or proposal applicable to a Government contract.

The detail and depth of records must be adequate to establish and maintain visibility of identified unallowable costs and directly associated costs.

3.2.4 Applying Selected Cost Principles

Applying Cost
Principles

To illustrate the application of cost principles, consider the following three exercises involving:

- Contingencies
- Contributions & Donations
- Airfares

See the following FAR pages to determine the answers to the questions. Answers are provided on page 3–32.

Exercise 1:
Contingencies

The offeror has proposed \$50,000 in scrap rate contingency costs. The contingency is based on historical experience of 3.5% scrap on direct material costs. Is the contingency allowable?

Exercise 2:
Contributions
& Donations

The offeror's overhead rate includes donations of camping equipment to the Boy Scouts. Is this donation allowable?

Exercise 3:
Airfares

The president of the offeror's company always flies first class. Is this cost allowable?

The next four pages contain the text from the Federal Acquisition Regulation regarding the following four cost principles:

FAR 31.205-1	PUBLIC RELATIONS AND ADVERTISING COSTS
FAR 31.205-7	CONTINGENCIES
FAR 31.205-8	CONTRIBUTIONS AND DONATIONS
FAR 31.205-46	TRAVEL COSTS

31.205 Selected costs.

31.205-1 Public relations and advertising costs.

(a) “Public relations” means all functions and activities dedicated to—

(1) Maintaining, protecting, and enhancing the image of a concern or its products; or

(2) Maintaining or promoting reciprocal understanding and favorable relations with the public at large, or any segment of the public. The term public relations includes activities associated with areas such as advertising, customer relations, etc.

(b) “Advertising” means the use of media to promote the sale of products or services and to accomplish the activities referred to in paragraph (d) of this subsection, regardless of the medium employed, when the advertiser has control over the form and content of what will appear, the media in which it will appear, and when it will appear. Advertising media include but are not limited to conventions, exhibits, free goods, samples, magazines, newspapers, trade papers, direct mail, dealer cards, window displays, outdoor advertising, radio, and television.

(c) Public relations and advertising costs include the costs of media time and space, purchased services performed by outside organizations, as well as the applicable portion of salaries, travel, and fringe benefits of employees engaged in the functions and activities identified in paragraphs (a) and (b) of this subsection.

(d) The only allowable advertising costs are those that are—

(1) Specifically required by contract, or that arise from requirements of Government contracts and that are exclusively for—

(i) Recruiting personnel required for performing contractual obligations, when considered in conjunction with all other recruitment costs (but see 31.205-34);

(ii) Acquiring scarce items for contract performance; or

(iii) Disposing of scrap or surplus materials acquired for contract performance.

(2) Costs of activities to promote sales of products normally sold to the U.S. Government, including trade shows, which contain a significant effort to promote exports from the United States. Such costs are allowable, notwithstanding subpara-

graphs (f)(1) and (3), subdivision (f)(4)(ii), and subparagraph (f)(5) of this subsection, subject to the limits contained in 31.205-38(c)(2). However, such costs do not include the costs of memorabilia (e.g., models, gifts, and souvenirs), alcoholic beverages, entertainment, and physical facilities which are primarily used for entertainment rather than product promotion.

(e) Allowable public relations costs include the following:

(1) Costs specifically required by contract.

(2) Costs of—

(i) Responding to inquiries on company policies and activities;

(ii) Communicating with the public, press, stockholders, creditors, and customers; and

(iii) Conducting general liaison with news media and Government public relations officers, to the extent that such activities are limited to communication and liaison necessary to keep the public informed on matters of public concern such as notice of contract awards, plant closings or openings, employee layoffs or rehires, financial information, etc.

(3) Costs of participation in community service activities (e.g., blood bank drives, charity drives, savings bond drives, disaster assistance, etc.).

(4) Costs of plant tours and open houses (but see subparagraph (f)(5) of this subsection).

(5) Costs of keel laying, ship launching, commissioning, and roll-out ceremonies, to the extent specifically provided for by contract.

(f) Unallowable public relations and advertising costs include the following:

(1) All public relations and advertising costs, other than those specified in paragraphs (d) and (e) of this subsection, whose primary purpose is to promote the sale of products or services by stimulating interest in a product or product line (except for those costs made allowable under 31.205-38(c)), or by disseminating messages calling favorable attention to the contractor for purposes of enhancing the company image to sell the company's products or services.

(2) All costs of trade shows and other special events which do not contain a significant effort to

promote the export sales of products normally sold to the U.S. Government.

(3) Costs of sponsoring meetings, symposia, seminars, and other special events when the principal purpose of the event is other than dissemination of technical information or stimulation of production.

(4) Costs of ceremonies such as (i) corporate celebrations and (ii) new product announcements.

(5) Costs of promotional material, motion pictures, videotapes, brochures, handouts, magazines, and other media that are designed to call favorable attention to the contractor and its activities (but see 31.205-13(a), Employee morale, health, welfare, food service, and dormitory costs and credits; 31.205-21, Labor relations costs; 31.205-43(c), Trade, business, technical, and professional activity costs; and 31.205-44, Training and education costs).

(6) Costs of souvenirs, models, imprinted clothing, buttons, and other mementos provided to customers or the public.

(7) Costs of memberships in civic and community organizations.

31.205-7 Contingencies.

(a) “Contingency,” as used in this subpart, means a possible future event or condition arising from presently known or unknown causes, the outcome of which is indeterminable at the present time.

(b) Costs for contingencies are generally unallowable for historical costing purposes because such costing deals with costs incurred and recorded on the contractor’s books. However, in some cases, as for example, terminations, a contingency factor may be recognized when it is applicable to a past period to give recognition to minor unsettled factors in the interest of expediting settlement.

(c) In connection with estimates of future costs, contingencies fall into two categories:

(1) Those that may arise from presently known and existing conditions, the effects of which are foreseeable within reasonable limits of accuracy; e.g., anticipated costs of rejects and defective work. Contingencies of this category are to be included in the estimates of future costs so as to provide the best estimate of performance cost.

(2) Those that may arise from presently known or unknown conditions, the effect of which cannot be measured so precisely as to provide equitable results to the contractor and to the Government; e.g., results of pending litigation. Contingencies of this category are to be excluded from cost estimates under the several items of cost, but should be disclosed separately (including the basis upon which the contingency is computed) to facilitate the negotiation of appropriate contractual coverage. (See, for example, 31.205-6(g), 31.205-19, and 31.205-24.)

31.205-8 Contributions or donations.

Contributions or donations, including cash, property and services, regardless of recipient, are unallowable, except as provided in 31.205-1(e)(3).

31.205-46 Travel costs.

(a)(1) Costs for transportation, lodging, meals, and incidental expenses incurred by contractor personnel on official company business are allowable subject to the limitations contained in this subsection. Costs for transportation may be based on mileage rates, actual costs incurred, or on a combination thereof, provided the method used results in a reasonable charge. Costs for lodging, meals, and incidental expenses may be based on per diem, actual expenses, or a combination thereof, provided the method used results in a reasonable charge.

(2) Except as provided in subparagraph (a)(3) of this subsection, costs incurred for lodging, meals, and incidental expenses (as defined in the regulations cited in (a)(2)(i) through (iii) of this subparagraph) shall be considered to be reasonable and allowable only to the extent that they do not exceed on a daily basis the maximum per diem rates in effect at the time of travel as set forth in the—

(i) Federal Travel Regulation, prescribed by the General Services Administration, for travel in the conterminous 48 United States, available on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock No. 022-001-81003-7;

(ii) Joint Travel Regulations, Volume 2, DoD Civilian Personnel, Appendix A, prescribed by the Department of Defense, for travel in Alaska, Hawaii, The Commonwealth of Puerto Rico, and territories and possessions of the United States, available on a subscription basis from the Superintendent of Documents.

ments, U.S. Government Printing Office, Washington, DC 20402, Stock No. 908-010-00000-1; or

(iii) Standardized Regulations (Government Civilians, Foreign Areas), Section 925, “Maximum Travel Per Diem Allowances for Foreign Areas,” prescribed by the Department of State, for travel in areas not covered in (a)(2)(i) and (ii) of this subparagraph, available on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock No. 744-008-00000-0.

(3) In special or unusual situations, actual costs in excess of the above-referenced maximum per diem rates are allowable provided that such amounts do not exceed the higher amounts authorized for Federal civilian employees as permitted in the regulations referenced in (a)(2)(i), (ii), or (iii) of this subsection. For such higher amounts to be allowable, all of the following conditions must be met:

(i) One of the conditions warranting approval of the actual expense method, as set forth in the regulations referenced in paragraphs (a)(2)(i), (ii), or (iii) of this subsection, must exist.

(ii) A written justification for use of the higher amounts must be approved by an officer of the contractor’s organization or designee to ensure that the authority is properly administered and controlled to prevent abuse.

(iii) If it becomes necessary to exercise the authority to use the higher actual expense method repetitively or on a continuing basis in a particular area, the contractor must obtain advance approval from the contracting officer.

(iv) Documentation to support actual costs incurred shall be in accordance with the contractor’s established practices provided that a receipt is required for each expenditure in excess of \$25.00. The approved justification required by (a)(3)(ii) and, if applicable, (a)(3)(iii) of this subparagraph must be retained.

(4) Subparagraphs (a)(2) and (a)(3) of this subsection do not incorporate the regulations cited in subdivisions (a)(2)(i), (ii), and (iii) of this subsection in their entirety. Only the maximum per diem rates, the definitions of lodging, meals, and incidental expenses, and the regulatory coverage dealing with special or unusual situations are incorporated herein.

(5) An advance agreement (see 31.109) with respect to compliance with subparagraphs (a)(2) and (a)(3) of this subsection may be useful and desirable.

(6) The maximum per diem rates referenced in subparagraph (a)(2) of this subsection generally would not constitute a reasonable daily charge—

(i) When no lodging costs are incurred; and/or

(ii) On partial travel days (*e.g.*, day of departure and return).

Appropriate downward adjustments from the maximum per diem rates would normally be required under these circumstances. While these adjustments need not be calculated in accordance with the Federal Travel Regulation or Joint Travel Regulations, they must result in a reasonable charge.

(b) Travel costs incurred in the normal course of overall administration of the business are allowable and shall be treated as indirect costs.

(c) Travel costs directly attributable to specific contract performance are allowable and may be charged to the contract under 31.202.

(d) Airfare costs in excess of the lowest customary standard, coach, or equivalent airfare offered during normal business hours are unallowable except when such accommodations require circuitous routing, require travel during unreasonable hours, excessively prolong travel, result in increased cost that would offset transportation savings, are not reasonably adequate for the physical or medical needs of the traveler, or are not reasonably available to meet mission requirements. However, in order for airfare costs in excess of the above standard airfare to be allowable, the applicable condition(s) set forth above must be documented and justified.

(e)(1) “Cost of travel by contractor-owned, -leased, or -chartered aircraft,” as used in this paragraph, includes the cost of lease, charter, operation (including personnel), maintenance, depreciation, insurance, and other related costs.

(2) The costs of travel by contractor-owned, -leased, or -chartered aircraft are limited to the standard airfare described in paragraph (d) of this subsection for the flight destination unless travel by such aircraft is specifically required by contract specification, term, or condition, or a higher

amount is approved by the contracting officer. A higher amount may be agreed to when one or more of the circumstances for justifying higher than standard airfare listed in paragraph (d) of this subsection are applicable, or when an advance agreement under subparagraph (e)(3) of this subsection has been executed. In all cases, travel by contractor-owned, -leased, or -chartered aircraft must be fully documented and justified. For each contractor-owned, -leased, or -chartered aircraft used for any business purpose which is charged or allocated, directly or indirectly, to a Government contract, the contractor must maintain and make available manifest/logs for all flights on such company aircraft. As a minimum, the manifest/log shall indicate—

- (i) Date, time, and points of departure;
- (ii) Destination, date, and time of arrival;
- (iii) Name of each passenger and relationship to the contractor;
- (iv) Authorization for trip; and
- (v) Purpose of trip.

(3) Where an advance agreement is proposed (see 31.109), consideration may be given to the following:

(i) Whether scheduled commercial airlines or other suitable, less costly, travel facilities are available at reasonable times, with reasonable frequency, and serve the required destinations conveniently.

(ii) Whether increased flexibility in scheduling results in time savings and more effective use of personnel that would outweigh additional travel costs.

(f) Costs of contractor-owned or -leased automobiles, as used in this paragraph, include the costs of lease, operation (including personnel), maintenance, depreciation, insurance, etc. These costs are allowable, if reasonable, to the extent that the automobiles are used for company business. That portion of the cost of company-furnished automobiles that relates to personal use by employees (including transportation to and from work) is compensation for personal services and is unallowable as stated in 31.205-6(m)(2).

Exercise 1: Contingencies

Answer: Yes. It is allowable under FAR 31.205-7(c)(1).

Exercise 2: Contributions & Donations

Answer: No. Donations are unallowable except for limited community activities as prescribed in FAR 31.205-1(e)(3), such as blood drives.

Exercise 3: Airfares

Answer: No, not all of it. The amount of the cost OVER coach fare is unallowable. However, the amount of the airfare up to the price of coach fare would be allowable under FAR 31.205-46(d)

Chapter Vignette

Researching the Procurement History

Andrew has been asked by Kay to take a look at the proposal for a follow-on procurement of radios. However, before he begins his analysis, Kay wants him to look at existing data surrounding the history of this procurement. In order to do this, Andrew has been told to look at the procurement history on previous “buys” on the radio, and look for any relevant audits, technical reports, or other data. While not quite sure where to start, Andrew figures he will stick with Kay’s suggestion to start with the statement of work. “It’s always good to know what you’re buying,” she tells him.

Course Learning Objectives

At the end of this chapter, you will be able to:

- Identify relevant data from acquisition histories and market research
- Prepare requests for and critique data from technical evaluators
- Prepare requests for and critique data from auditors.

Chapter Overview

Overview

If you are involved in cost analysis, you must understand what data are required and how, when, and where to obtain them.

In this chapter, you will be introduced to the principles involved in:

- collecting and reviewing available data
 - requesting and analyzing technical support
 - requesting and analyzing audit support
-

Chapter Overview

(continued)

Maps in This Chapter

This chapter includes the following maps:

4.1 COLLECTING AND REVIEWING AVAILABLE DATA	4-5
4.1.1 Review the Proposal Against the RFP.....	4-6
4.1.2 Review Program Histories.....	4-8
4.1.3 Review Procurement Histories	4-10
4.1.4 Review Forward Pricing Rates.....	4-13
4.1.5 Contractor System Reviews	4-14
4.1.6 Market Research.....	4-17
4.2 REQUESTING AND ANALYZING TECHNICAL SUPPORT.	4-18
4.2.1 Technical Support Request.....	4-19
4.2.2 Technical Support Analysis.....	4-20
4.3 REQUESTING AND ANALYZING AUDIT SUPPORT	4-24
4.3.1 Need for Audit Support	4-25
4.3.2 Audit Support Request	4-26
4.3.3 Assist Audit.....	4-28
4.3.4 Reviewing the Audit Evaluation.....	4-30

4.1 COLLECTING AND REVIEWING AVAILABLE DATA

Section Overview

Overview

FAR 15.805-3

To evaluate proposed prices and the offeror's potential for successfully providing the deliverable, you have two basic sources of data:

- Contract files
 - Market research
-

Contract Files

Begin by researching files on prior contracts for the same or comparable contract deliverables. Also search for files on contracts with the offeror regardless of deliverable. Sources of these files include:

- Your contracting activity
- Other contracting activities
- Contract administration activities of your agency
- The Defense Contract Management Command

In these files, look for:

- Contract specifications and/or statement of work from the RFP AND from past contracts for the same or comparable deliverables.
 - Program and procurement histories of past contracts for the deliverable AND past contracts with the offeror.
 - Prior audits and technical reviews of past proposals submitted by the offeror.
 - Proposals and negotiation memoranda from prior negotiations with the offeror.
 - Contractor system reviews of the offeror, including such reviews as Purchasing System Reviews, Performance Assessment Reviews, and Contractor Estimating System Reviews. Reports from these reviews are most likely to be available from the Defense Contract Management Command.
-

Maps in this Section

This section contains the following maps:

- Review the Proposal Against the RFP
 - Review Program Histories
 - Review Procurement Histories
 - Review Forward Pricing Rates
 - Contractor System Reviews
 - Market Research
-

4.1.1 Review the Proposal Against the RFP

Introduction	One cannot overestimate the importance of the RFP. The RFP conveys the Statement of Work, related Specifications, and other related terms and conditions (e.g., delivery dates). These define the Government requirement for the contract effort.
--------------	---

Potential Issues	<p>Begin by reviewing the RFP. During this review, consider the following questions:</p> <ul style="list-style-type: none">• <i>Do the Specifications/SOW clearly express what the Government user requires in a manner that will permit cost effective contract performance?</i> <p>Government requirements are expressed in the form of functional, performance, or design specifications. In the real world, a specification rarely falls neatly into one of these categories. Nearly every specification contains some elements of all three forms. Characterizing a specification as “functional”, “performance” or “design” merely reflects which category predominates.</p> <p>Functional Specifications state the requirement in terms of performance characteristics and intended use, including those characteristics which at minimum are necessary to satisfy the intended use. Definition is as general as possible to permit the broadest possible competition. For example, an offensive weapon capability might be defined in terms that would permit consideration of solutions involving aircraft, missiles, long-range artillery, or some other approach.</p> <p>Performance Specification state the requirement in terms of desired operational characteristics. Performance specifications tend to be more restrictive than functional specifications, in terms of limiting alternatives which the Government will consider and defining separate performance standards for each such alternative. In this type of specification, the details of design, fabrication, and internal structure are left to the option of the offeror, EXCEPT that certain features or parts may be required specifically.</p> <p>Performance specifications are often used when NO suitable commercial product is available and when there is NO standardized Government design. In such cases, purchase may be made against a performance specification and the design details left to the offeror. In this way, it is possible to get maximum competition on specialized products.</p> <p>A performance specification MUST include a range of acceptable characteristics or minimum acceptable standards.</p>
---------------------	--

Continued on next page

4.1.1 Review the Proposal Against the RFP

(continued)

Potential
Issues

(continued)

Design Specification: A design specification spells out, in detail, the materials to be used, their sizes and shapes, and how the product is to be fabricated and built. It completely defines a product, which can then be manufactured by a competent manufacturer in the industry.

Where the Government furnishes design specifications that control work under the contract, it is presumed that the specifications are adequate for the purposes intended and that, if adhered to, the desired result will be obtained. Specifications should be tailored to specific requirements to establish the minimum needs of the Government.

- *When the offeror's proposal is compared with the specifications or SOW, is it clear that the offeror is proposing to provide exactly what is required?*

Have all tasks and deliverable items required by contract been accounted for in the proposal? It may be necessary to secure technical assistance to verify that the proposal does, in fact, provide for the necessary effort to meet the specifications.

Has the offeror proposed different terms and conditions for the work than contemplated by the Government? If so, be alert for any impact on proposed costs and ask whether the cost estimate would have been higher or lower if based on the RFP as originally issued.

Such comparisons provide insights into the offeror's understanding of the statement of work. To the extent that the contractor's understanding varies from the Government's actual need, proposed costs are likely to be overstated or understated.

4.1.2 Review Program Histories

Introduction Program histories can provide useful insights into the current proposal. By “program histories”, we mean files on contracts for the same or comparable deliverables, whether or not the current offeror had been awarded those contracts. You can use data from these files for many purposes, such as comparing past estimates of costs and past actual costs with the cost data and estimates submitted by the offeror with its current proposal. However, ***historical cost data must be used with care.*** The entire contracting environment, then and now, must be considered. Two considerations are particularly important: **past problems** and **significant changes**.

Identify Past Problems Identification of problems from prior contracts can give useful insight into the accuracy of current estimates. Consider the following questions:

- ***What problems have been experienced in pricing the deliverable?***

How was price negotiated in prior buys? What were the cost-related issues, problems, and trends in past negotiations for the deliverable?
- ***How have past cost estimates compared with actual costs?***

Be especially alert for patterns of overstating both the risks and costs inherent in the work.
- ***What problems have been experienced in providing the deliverable?***

Have the problems been resolved? Has the offeror acknowledged those problems in the proposal? Does the offeror assume that the same problems will be experienced in the future? If the problems have been fixed or if the offeror is proposing a fix, has the offeror adjusted its cost estimates accordingly?

For example — one contractor continued to propose a scrap rate of 50% even though it had solved the scrap problem and reduced the actual scrap rate to 5%.

(continued on next page)

4.1.2 Review Program Histories

(continued)

Identify
Project or
Contract
Changes

Identification of changes in the contract or program or contract environment over the course of the prior contracts can also give useful insight into the accuracy of current estimates. Consider the following questions to identify changes:

- ***Have contract requirements changed?***

Changes in specifications, statement of work, or business terms will likely affect costs. For example, if a tolerance has been relaxed or a specific process or inspection is NO longer required, projected costs could be overstated.

- ***Will there be any changes in the production environment?***

If the offeror will be using production methods superior to those employed on prior contracts, then the improvements need to be reflected in projected costs. Examine the impact, in particular, on costs associated with work effort, material usage, and scrap.

- ***Will there be any changes in the make-or-buy program?***

If the offeror plans to change sources, either in-house or out-sourcing, projected costs can vary significantly from historical costs. Producing previously subcontracted items in-house will increase in-house costs and reduce subcontract costs. Give special attention to the effect such changes have on total cost. If such a change increases total cost, make-or-buy decision criteria require further examination.

- ***Have business or general economic conditions changed?***

Changes in business or general economic conditions will also affect costs. Historical costs must be adjusted for these changes. The most obvious example is inflation/deflation.

4.1.3 Review Procurement Histories

Introduction	Procurement histories can provide useful insights into the current proposal. By “procurement histories”, we mean all contract files that include proposals from or awards to the offeror, regardless of program or project. When reviewing procurement histories, look for:
--------------	---

- Data on proposed and actual costs for similar work
 - Problems in estimating costs
 - Past issues in negotiating costs
-

Data on Similar Work	Similar products can be used as a general test of reasonableness. Also, if the products use the same or similar processes or facilities, the data from the similar product can be used to verify not only reasonableness, but also the consistency and accuracy of the current proposal.
-------------------------	--

Consider the following questions when investigating purchases of similar items:

- *Are similar items produced by the offeror?*

Similarity is usually defined by similarity of processes, technical requirements, or product.

- *How do costs and production methods for similar products compare with those proposed?*

Often, similar products are produced by the same workers, using the same equipment. Comparisons can reveal significant data on cost, particularly when the product offered has never been produced before.

(continued on next page)

4.1.3 Review Procurement Histories (continued)

Problems In Estimating Costs

Consider the following questions:

- ***Does the offeror have a history of problems in accurately estimating costs?***

Has the offeror shown a historical tendency to over/under-run cost estimates? Historical tendencies are useful indicators of future projected costs.

- ***Are there patterns of questioned costs that are similar to costs estimated in the current proposal?***

If patterns are found to exist, similar cost estimates in the current proposal should be closely scrutinized.

- ***Does the offeror have a history of problems in adequately supporting cost estimates?***

Have there been significant errors or misrepresentations in proposals previously submitted by the offeror? It is quite possible that the historical proposal problems exist in the current proposal, too.

- ***Does the offeror have a history of problems in controlling costs?***

Did the offeror experience cost overruns attributable to historical problems that do NOT or should NOT exist today? Uncritical use of historical cost projections could lead to excessive proposed costs.

- ***Have the offeror's accounting practices changed?***

If the offeror has changed how a particular type of cost is classified or accumulated since the last time the proposed article was produced, the projected costs may be grossly distorted. For example, if a particular cost had been classified as a direct cost, and now it is an indirect cost, the cost totals in both cost groupings will be affected.

(continued on next page)

4.1.3 Review Procurement Histories (continued)

Past Issues in
Negotiating
Costs

FAR 15.808

At the close of each price negotiation, the contracting officer must prepare a PNM that details all significant aspects of the negotiation. The PNM should cover (among other things):

- The offeror's cost proposal.
- Audit and technical recommendations, along with reasons for any pertinent variances from those recommendations.
- The most significant facts or considerations in establishing prenegotiation price objectives.
- The most significant facts or considerations in establishing the negotiated price, with explanation of any significant differences between the Government's prenegotiation objectives and the final price.
- If certified cost or pricing data had been required, the extent to which the contracting officer relied on submitted data and used them in negotiating price.
- The basis for determining the profit or fee prenegotiation objective and the profit or fee negotiated.

This information provides an “audit trail” of how each negotiated price was developed. Consider the following questions, when reviewing PNMs:

- ***How was the price negotiated?***

Since the PNM should explain the build up of the negotiated price on an item, you should be able to construct a similar cost and profit build up on the current proposal.

- ***What were the major problems and negotiation points?***

The PNM will identify proposal problems and major points that came up during fact-finding and negotiation. Many of these same issues may come up in the current proposal. Referring to prior PNMs can help you identify key areas and tell you how they were handled.

- ***Were any pricing precedents established during previous negotiations that may affect the current negotiations?***

Beyond resolving issues in previous negotiations, if an agreement was reached on how to handle a specific type of cost or situation, then that precedent should be considered on the current proposal. The previous PNM provides a basis for verifying that the precedent is being honored in the current proposal.

4.1.4 Review Forward Pricing Rates

Proposed Overhead Forward Pricing Rates

Reports on overhead forward pricing rates normally include such data as:

- projected business volume
- capital expenditures
- workforce levels
- facility rearrangements

For a large company, these reports can be very lengthy, so contact the cognizant Administrative Contracting Officer or responsible auditor prior to requesting them. When reviewing such reports, consider the following questions:

- ***What rates have been recommended by the auditor?***

Audit recommendations provide rates that may be useful in cost analysis and contract negotiation, particularly when forward pricing rates have not been negotiated.

- ***In situations where there is an administrative contracting officer assigned to negotiate forward pricing rates, what rates are currently negotiated or recommended?***

Analysis and negotiation of overhead rates will be considered in more detail in Chapter 10.

After considering these reports, consider asking the ACO or auditor to discuss the probability of any impending rate changes and the approximate amount of changes in the rates.

Proposed Forward Pricing Labor Rates

Relevant information in the reports on forward pricing labor rights might include the number, skills, and seniority of the workforce that would be available during the current proposal's period of performance. When reviewing this report, consider the following questions:

- ***What rates have been recommended by the auditor?***

As with overhead rates, audit recommendations may be useful in cost analysis and contract negotiation, particularly when forward pricing rates have not been negotiated.

- ***In situations where there is an administrative contracting officer assigned to negotiate forward pricing rates, what rates are currently negotiated or recommended?***

Analysis and negotiation of labor rates will be considered in more detail in Chapter 8.

4.1.5 Contractor Systems Reviews

Introduction

At major contractor locations, the Government typically conducts a variety of system level reviews. The ultimate purpose of all these reviews is to assure that contractor management systems are capable of providing an acceptable deliverable on time and at a reasonable cost. These system level reviews include:

- Contractor Purchasing System Review
- Performance Assessment Review
- Contractor Estimating System Review

Contractor Purchasing System Review (CPSR)

The Contractor Purchasing System Review (CPSR) is a periodic review normally conducted by an itinerant Government team. This review is an audit of purchase order records and purchasing policies and procedures. The objective is to ensure that the Government's interests are being adequately protected by the prime contractor.

Check the CPSR to determine:

- ***Is the offeror's purchasing system currently approved by the Government?***

If the system receives approval, the majority of purchase orders, EXCEPT high dollar cost reimbursable orders, etc., can be placed by the prime contractor WITHOUT first seeking the consent of the contracting officer.

If system approval is withdrawn or denied, then all but the smaller fixed price orders MUST be consented to by the contracting officer prior to issue. A disapproved system is a red flag that the subcontractor/material portion of a cost proposal may be overpriced. Identify the specific pricing problems that resulted in disapproval (e.g., lack of competition, lack of mailing lists of vendors by part, ordering in less than economic quantities, or inadequate cost analyses of subcontractor proposals). In reviewing the firm's cost proposals, determine whether these problems have affected the price being offered the Government.

Regardless of system approval or lack of approval, the contracting officer is still responsible for determining if the price is fair and reasonable. The CPSR is NOT a substitute for cost or price analysis.

(continued on next page)

4.1.5 Contractor Systems Reviews

(continued)

Performance Assessment Review

This review, sometimes also known as **Contractor Operations Review (COR)** or **Contractor Systems Status Review (CSSR)**, is conducted on major contractors by a specially assembled team. The purpose of this review is to assess the strength of contractor management systems. In theory, if all aspects of a company are well managed, then it is reasonable to expect the company to perform well on Government contracts.

Areas covered in a typical review include:

- quality assurance
- manufacturing
- engineering
- purchasing
- property administration
- safety and security
- proposal preparation
- estimating
- contract administration and finance

When consulting a Performance Assessment Review, ask the following question:

- *What deficiencies were found?*

Deficiencies in any of the above areas could potentially impact the quality and validity of a cost proposal.

(continued on next page)

4.1.5 Contractor Systems Reviews

(continued)

Contractor
Estimating
System
Review
(CESR)

The CESR is normally an audit/contract administration team effort led by a representative from the cognizant audit activity. The purposes of the review are to reduce the time and scope of reviews of individual proposals, to expedite the negotiation process, and to increase the reliability of the offeror's cost proposals.

The review is an excellent source of information for highlighting weaknesses and problem areas in cost proposals. In addition to the review report itself, pertinent findings are typically included in individual proposal audits. When consulting a CESR, consider the following:

- ***What deficiencies have been noted and how do these deficiencies affect this proposal?***

Indicators of a potentially deficient estimating system include:

- failure to assure that relevant historical data (especially the most recent data) are available to, and utilized by, cost estimators
- continuing failure to analyze material costs, or failure to perform subcontractor cost reviews
- consistent absence of analytical support for significant amounts of proposed cost
- excessive reliance on individual proposal judgement where historical experience or commonly used standards are available
- recurring defective pricing findings within the same cost elements
- failure to integrate relevant parts of other management systems with the estimating system, resulting in an impaired ability to generate reliable cost estimates
- failure to provide established policies, procedures, and practices to persons responsible for preparing and supporting estimates

4.1.6 Market Research

Introduction

Market research goes beyond looking at in-house Government acquisition files. A number of other sources can also provide valuable data, which can be used for either cost analysis or price analysis.

Example

The bill of materials for a major subassembly includes several commercially available items. The proposed cost for these items can be compared with commercial catalog prices for reasonableness, delivery lead-time, and minimum order quantity. This information can then be used to support a detailed cost analysis of the higher level subassembly.

Sources of Market Research Data

MARKET DATA SOURCE	USES OF DATA
Computerized Databases	<ul style="list-style-type: none"> Part number prices, quantities, & delivery dates Reference to prior pricing cases
Manual Item Records	<ul style="list-style-type: none"> Part number prices, quantities, & delivery dates Reference to prior pricing cases
Catalog	<ul style="list-style-type: none"> Part number prices, delivery information, & order quantity Pictures of products
Economic Indexes	<ul style="list-style-type: none"> Escalation factors for labor & material
Trade Journals	<ul style="list-style-type: none"> Current prices, trends in prices, delivery information, & order quantity
Product Brochures	<ul style="list-style-type: none"> Part number prices, delivery information, & order quantity Pictures of products
Federal Supply Schedules	<ul style="list-style-type: none"> Pricing & discount information Pictures of products Description of products

4.2 REQUESTING AND ANALYZING TECHNICAL SUPPORT

Section Overview

Introduction	A key factor in ensuring fair and reasonable prices is the use of high quality, timely technical evaluations of the offeror's proposal. Through these reports, you receive the benefit of the knowledge, training, and skill of engineers and other technical disciplines. The technical evaluation allows you to get “behind the numbers” and understand the assumptions and basis for proposed activities and costs.
--------------	--

Maps in this Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• Technical Support Request• Technical Support Analysis
----------------------	---

4.2.1 Technical Support Request

Introduction

FAR 15.805-4

In order to get the answers you need, you need to ask the right questions. It is the responsibility of the requester to make clear what is needed and when. Without this direction, the technical reviewer will be guessing.

Typical Elements Requiring Technical Analysis

The following is a list of some of the areas that may require technical evaluation:

- quantities and kinds of materials
 - number of labor hours
 - labor skill mix
 - special tooling, special test equipment, and facilities
 - scrap and spoilage factors
 - procedures and processes
 - shop loading vs. delivery schedules
 - make-or-buy decisions
 - trends in production efficiency
 - technical track record of a specific offeror
-

In-house Support

Requiring activities normally employ engineers and technical personnel who are intimately familiar with program and development issues. Their knowledge can be very useful, especially from an overall activity perspective. Ask for their support whenever there are technical issues requiring analysis.

Formal Technical Support

Formal technical support can come from either (1) itinerant government technical personnel or (2) in-plant Government technical personnel.

Itinerant Government Technical Personnel. The itinerant Government technical personnel, such as those found in Defense Contract Management Command Area Offices (DCMAOs), are available to go to offeror facilities to review source data supporting a proposal and talk with the offeror's technical personnel. DCMAO personnel support more than just the DoD. They may be called upon by any agency purchasing from firms in DCMAO's areas of expertise.

(continued on next page)

4.2.1 Technical Support Request

(continued)

Formal
Technical
Support
(continued)

In-plant Government Technical Personnel. The in-plant government technical personnel, such as those found in Defense Plant Representative Offices (DPROs), are available at some large companies where the volume of Government contracts is significant. Since these engineers and technical personnel are continuously with the offeror, their knowledge of offeror technical practices and strengths/weaknesses is extensive, as is their access to offeror data and data on various parts and processes collected by the plant representative office.

Field Pricing
Reports

When technical analyses are prepared by organizations such as DCMAOs and DPROs, these analyses are generally part of the field pricing report (along with any audit review from the cognizant contract audit activity).

The contracting officer **MUST** request a field pricing report before negotiating any contract or modification from a proposal in excess of \$500,000, **UNLESS**:

- otherwise authorized under agency procedures, **OR**
- information available to the contracting officer is considered adequate to determine the reasonableness of the proposed cost or price.

Field pricing support is normally **NOT** requested for proposals of \$500,000 or less.

If there are deficiencies in the offeror's estimating system or other circumstances raise questions about the accuracy of the offeror's estimate, consider requesting a field pricing report for a proposal under the threshold.

Requesting
Technical
Support

Requests for support should be tailored to ask for minimum essential information needed to ensure a fair and reasonable price.

The requester **MUST**:

- state the extent of support needed
 - identify specific areas where input is required
 - include, with the request, the information needed to perform the review
 - assign a realistic deadline for receipt of the report
-

4.2.2 Technical Support Analysis

Introduction

After the technical report is received, review the report for strengths and inconsistencies within the report, discrepancies between the technical analysis and other data. When necessary, request additional support or data from the technical evaluator.

Review the Technical Report

- ***Does the report answer the questions in your request?***

Good technical reports begin with good clear requests. If the request was clear on what is needed, the technical report should address all the stated concerns.

- ***Does the report explain its position in clear language that can be understood by non-technical price analysts and negotiators?***

While the contract specialist responsible for integrating the technical analysis into the overall Government position needs to “translate” and incorporate technical analyses into the overall position, the technical evaluation **MUST** clearly communicate its recommendations and stand on its own.

- ***Does the report support its conclusions?***

The “looks good to me” or “based on my experience and judgement” reports are of little use in negotiations. Each conclusion, whether it agrees with or disputes the offeror's proposal, **MUST** be accompanied by a rationale. A good technical evaluation will tell you what was analyzed and how it was analyzed.

(continued on next page)

4.2.2 Technical Support Analysis

(continued)

Recognize
Problems with
Technical
Analyses

Common problems in technical reports include:

- lack of clear explanation of positions taken
- lack of support for positions taken
- inconsistent treatment of similar costs

A negotiator will NOT be able to sustain a technical evaluation position if there is no support for why the Government position is better than the proposed position. Clear explanations of how a position was developed and why it is more appropriate than the offeror's position are critical to reaching a fair reasonable price.

Inconsistencies within a technical evaluation occur when a process or part is estimated using different techniques. As examples:

1. Using average run times for a group of parts EXCEPT when the times are lower than average is inconsistent. If the average is NOT acceptable, then a discrete review on each part may be in order.
2. Another common inconsistency is the use of different analysis techniques in different reports for the same part. Clearly, inconsistencies raise a question about the validity of the technical analysis, and make it very difficult to effectively use these analyses in negotiations.

Identify
Discrepancies
between the
Technical
Analysis and
Other Data

The auditor will normally incorporate into the audit the technical report if received prior to issuance of the audit. If the technical report is NOT received in time to incorporate it into the audit report, the auditor will typically “qualify” the audit report to reflect the absence of a technical report and attempt to evaluate the proposed effort without it. Since auditors are closely tied to historical cost and projections using history, the auditor will generally disallow proposed values based on engineering estimates or round-table estimates where there is no history to support the numbers.

(continued on next page)

4.2.2 Technical Support Analysis

(continued)

Reconciling Discrepancies

For example, an audit report might question all proposed labor hours while the technical analysis accepts all the hours. The contract specialist responsible for the overall field pricing report must reconcile these inconsistencies and provide a rationale for his or her recommended position on labor hours (which may differ from that of both the auditor and technical reviewer). Suppose the pricing report accepts the proposed hours based on the technical analysis. In that case, the pricing report should also acknowledge the facts that the proposed effort is new and that no cost history exists, as pointed out in the audit report. These reports are advisory; you do NOT have to follow them. You do need to document how you developed your position and how you used the reports in developing that position.

Evaluating Analysis Results

Occasionally, a technical analysis on an item with a long production history will give a recommendation seemingly inconsistent with its own results. However, the results of an analysis have to be kept in perspective. For example, a recommendation based on a simple average of historical costs would overstate the estimated future cost if the historical trend has been downward. Another example is where the recommendation includes extensive changes in equipment and processes that would result in significant reductions in unit cost. Before basing your position on the assumption that the contractor should make those changes, consider actual trends in product improvement and what the contractor can reasonably be expected to invest on capital equipment given the dollar value of your contract and potential follow-on contracts that can benefit from that same equipment.

Requesting Clarification or Additional Data

When you need clarification or additional support, request it. A request for clarification should NOT be regarded as a new request for technical analysis. Technical analysts have a responsibility to support their findings.

4.3 REQUESTING AND ANALYZING AUDIT SUPPORT

Section Overview

Overview

Since the Government auditor is the only one with general access to offeror accounting records, the auditor is a major source of proposal review advice. To properly take advantage of this valuable resource, you need to understand:

- the auditor's role
- how and when to request it
- the concept of “assist audits”
- how to review the audit evaluation

Maps in this Section

This section contains the following maps:

- Need for Audit Support
 - Audit Support Request
 - Assist Audit
 - Reviewing the Audit Evaluation
-

4.3.1 Need for Audit Support

Introduction	Audit support can be very useful in analyzing a proposal. The unique position and authority of Government auditors allows them to thoroughly explore the support and accounting data that back up a proposal.
Auditor's Role	The auditor's role is <i>advisory</i> . In a cost proposal review the auditor can advise and recommend, but NOT direct the contracting officer. However, if the contracting officer does NOT accept the auditor's recommendations, the contracting officer MUST document the rationale in pre-negotiation documentation and the Price Negotiation Memorandum.
Situations Requiring Audits	<p>When cost or pricing data are required for a proposal OVER \$500,000, the contracting officer MUST request a field pricing report (which may include an audit) before negotiating. If the contracting officer determines that available data are adequate to determine price reasonableness, the written documentation of the basis of that determination MUST be placed in the contract file.</p> <p>Audit requests at lower values may be made if the reasonableness of a proposed price CANNOT be established due to:</p> <ul style="list-style-type: none"> • lack of knowledge of the particular contractor • existence of sensitive conditions • inability to evaluate the price reasonableness through cost and price analyses of existing data

4.3.2 Audit Support Request

Introduction

FAR 15.805-5(e)

In order to be effective, requests for audit support need to be directed to the correct sources and should identify what is needed in as much detail as possible.

Sources of Audit Support

With the exception of the Department of Defense, audit support is obtained from the **proposal audit function**, normally found within the Office of the Inspector General.

Within the Department of Defense, an independent agency, the **Defense Contract Audit Agency (DCAA)**, exists to perform all contract auditing for the Department of Defense and other Government agencies. DCAA may be called upon for support by a civilian agency Inspector General.

Part of Technical Support

Audit requests **MUST** be made in writing. Agency procedures will determine if the request will normally be part of a requirement for both technical and audit support or for audit support alone. In either case, the request **MUST**:

- Prescribe the extent of support needed, by selecting one of the following options.
 - complete detailed audit including technical analysis reports
 - complete detailed audit of selected proposed cost elements
 - audit of labor and overhead rates only
 - desk audit to provide an audit opinion using available data without an in-depth review of proposed costs
 - desk audit supplemented by detailed audit of selected cost elements
 - State the specific areas of input desired
 - Included information necessary to perform the review
 - cost proposal including SF 1411
 - any related documentation submitted by the offeror
 - any technical analyses already completed
 - Assign a realistic deadline for receipt of the report
-

(continued on next page)

4.3.2 Audit Support Request

(continued)

Audit Reports
Without
Technical
Analysis
(continued)

There are three main reasons for audit reports without technical analysis:

1. The agency is exempted from the requirement for a field pricing report that includes a technical evaluation.
2. The requester specifically stated that a technical analysis was NOT needed, or NOT available.

The most common reasons a requester might specifically state that technical analysis is NOT required:

- to reduce the time to get a report
 - the requesting organization plans on using its own technical resources
 - a technical evaluation from a previous review is available
3. The technical analysis was NOT completed in time to incorporate in the audit report.

The most common reason for a technical analysis NOT to be completed in time for incorporation into the audit report is a backlog in the activity responsible for performing the analysis.

In such cases, the audit report will be “qualified” due to the lack of a technical analysis. The auditor, **using audit, NOT engineering, techniques**, will attempt to provide some review of technical areas.

4.3.3 Assist Audit

Introduction	The contracting officer's responsibility to ensure fair and reasonable contract costs is NOT limited to the costs incurred by the offeror. The costs that flow up from lower tier vendors can be a significant part of total cost, and they, too, must be fair and reasonable.
Requesting an Assist Audit	Request for assist audits of subcontractor cost or pricing data may be made when any one of the following occur: <ul style="list-style-type: none"> It is necessary for adequately pricing the offeror's proposal AND there is a business relationship between the contractor and subcontractor NOT conducive to independence and objectivity. The offeror is a sole-source, and the subcontract costs represent a substantial part of the contract cost. The contracting officer determines that, because of factors such as the size of the proposed subcontract price, audit or field pricing support for a subcontract or subcontracts at any tier is critical to a fully detailed analysis of the prime contract proposal. For example, some contracting officers request an audit on any subcontract that accounts for more than 10% of the overall price, regardless of the review performed by the prime contractor. The offeror has been denied access to subcontractor records.
Subcontracting Pricing is Prime Contractor Responsibility	Although the contracting officer has responsibility for ensuring that the total contract price is fair and reasonable, the offeror holds primary responsibility for vendors. Privity of contract (a direct contractual relationship) exists between offerors and their suppliers. There is no direct contractual relationship between the Government and any firm except the prime contractor. The offeror is responsible for analyzing the proposed prices of its suppliers. The contracting officer should consider whether the interests of the Government are served before requesting assist audits on behalf of the offeror.

FAR
15.806-3(a)

(continued on next page)

4.3.3 Assist Audit

(continued)

Requesting Audit or Field Pricing Support	<p>If a need for an assist audit arises under the criteria shown above, the Administrative Contracting Officer cognizant over the offeror will request assistance through the Administrative Contracting Officer(s) cognizant over the vendor(s) down through the vendor tiers.</p>
Requests Must Include	<p>When the contracting officer requests the cognizant Administrative Contracting Officer or auditor to review a subcontractor's cost estimate, the request MUST include, when available, a copy of:</p> <ul style="list-style-type: none"> • any review prepared by the prime contractor or higher tier subcontractor • the subcontractor's proposal • cost or pricing data provided by the subcontractor • the results of the prime contractor's cost or price analysis
Giving Information to Higher Tier Contractors	<p>When the Government performs the subcontract analysis, the Government SHALL furnish to the prime contractor or higher tier subcontractor, <i>with the consent</i> of the subcontractor reviewed, a summary of the analysis—by element—performed in determining any UNACCEPTABLE costs included in the subcontract proposal.</p> <p>If the subcontractor <i>withholds consent</i>, the Government MUST furnish a range of unacceptable costs for each element in such a way as to prevent disclosure of subcontractor proprietary data.</p>

4.3.4 Reviewing the Audit Evaluation

Reviewing the Audit Report

Review the audit report to be sure that it meets your needs. Basic questions to ask are:

- ***Does the report answer your request?***

The auditors prepare their reports using a standard audit approach; however, you still **MUST** ensure that your needs are met and that any special requests were honored.

- ***Does the report explain the recommendation in clear, understandable language?***

The audit **MUST** communicate its recommendations clearly.

- ***Does the audit support its conclusions?***

Using a standard audit format, the audit report will have a summary of conclusions and recommendations. The heart of the support for these will be in the “schedules” that break down the proposal into its proposed cost elements. The schedules need to adequately support the conclusions.

Elements of a Typical Audit Report

FAR 15.805-5(e)

The auditor is responsible for the scope and depth of the audit. As a minimum, the audit report shall include the following elements:

- the findings on specific areas listed in the contracting officer's request
- an explanation of the basis and method used by the offeror in proposal preparation
- an identification of the original proposal and of all subsequent written formal and other identifiable submissions by which cost or pricing data were either submitted or identified
- a description of cost or pricing data coming to the attention of the auditor that were **NOT** submitted but that may have a significant effect on the proposed cost or price

(continued on next page)

4.3.4 Reviewing the Audit Evaluation

(continued)

Elements of a
Typical Audit
Report
(continued)

FAR 15.805-5(d)

-
- a list of any cost or pricing data submitted that are NOT accurate, complete, and current and of any cost representations that are unsupported. When the result of deficiencies is so great that the auditor CANNOT perform an audit or considers the proposal unacceptable as a basis for negotiation, the contracting officer shall be orally notified so that prompt corrective action may be taken, as provided by FAR 15.805-5(d). The auditor will immediately confirm the notification in writing, explaining the deficiencies and the cost impact on the proposal.
 - the originals of all technical analyses received by the auditor and a quantification of the dollar effect of the technical analysis findings
 - if the auditor believes that the offeror's estimating methods or accounting system are inadequate to support the proposal or to permit satisfactory administration of the contract contemplated, a statement to that effect
 - a statement of the extent to which the auditor has discussed discrepancies or mistakes of fact in the proposal with the offeror
-

Recognize
Problems with
Audit Report

The major problem in some audit reports lies in the inconsistency between the conclusions and the supporting schedules. Close attention should be paid to the summary remarks in the audit report. The conclusions and recommendations stated here are the key issues the contracting officer will need to address. The support and explanation for the auditors' position will be in the audit report "schedules." Ensure that the magnitude and impact of the conclusions are consistent with the actual finding as described in the schedules.

The explanation and rationale for an audit finding must be clearly stated and understandable. The audit report may draw conclusions on Cost Accounting Standards and cost principles issues that require Administrative Contracting Officer resolution. Since the resolution of these issues may be precedent setting, close coordination and discussion with the auditors on their intent and the severity of the problem are essential.

(continued on next page)

4.3.4 Reviewing the Audit Evaluation

(continued)

Identify Discrepancies between Audit Findings and Other Data	<p>Identify discrepancies found between audit findings and other data. Address ALL of these discrepancies in pre-negotiation positions and the Price Negotiation Memorandum.</p> <p>A classic discrepancy is an audit finding that labor hours are insupportable because they are based on engineering estimates that are NOT auditable, while the technical report recognizes all or a major portion of the hours. There really is no discrepancy. The apparent discrepancy is the result of different review approaches. The auditor is NOT qualified to exercise engineering judgement. In this case, the technical reviewer is the more qualified source.</p>
Request Clarification or Additional Supporting Data	<p>Minor requests for clarification or additional supporting data usually can be handled directly with the auditor.</p> <p>If the clarification or additional information leads to a change in the audit report, the auditor will release a formal document amending the original report.</p> <p>If there is a substantial change in the offeror's proposal or data, you may need to request a new audit. Due to the time and effort required to request and prepare a new audit, requests of this nature should be kept to a minimum.</p>
Take Exception to Audit Findings	<p>If the contracting officer does NOT concur with the recommendations, he/she MUST document the basis for his/her position and present it for review to higher level management (see your agency regulations for specific procedures). Reporting requirements and time tables for resolution of audit findings may be defined in agency regulations. These procedures do NOT restrict contracting officers from exercising their authority. The procedures are intended to ensure timely and documented disposition of audit issues.</p>

(continued on next page)

4.3.4 Reviewing the Audit Evaluation

(continued)

Determine the
Acceptability
of the
Contractor's
Accounting
System

The audit report will normally contain a statement on the adequacy of the offeror's accounting system. Accounting system adequacy is especially critical if the award is to be made on a cost-plus, redeterminable, or fixed price incentive basis, or where progress payments are anticipated, since the offeror's cost accounting records will be used to determine payments and final prices.

Cost analysis concerns over acceptability of the accounting system focus on the use of historical cost records for future cost projections. Simply stated: if the historical costs are questionable, then the projections from those costs are equally questionable. Caution should be used when dealing with questionable accounting systems. In this circumstance, you need to work closely with the responsible auditor and cognizant contracting officer.

End-of-Chapter Vignette

Kay has asked you to help Andrew if he has any questions. After reviewing the proposal, Andrew has come to you with several questions.

- 1. Having reviewed the WEC proposal, are there any specific areas that you would identify in your request for technical input?*
- 2. Having reviewed the WEC proposal, are there any specific areas that you would identify in your request for audit input?*
- 3. What program history is identified in the proposal?*
- 4. If you wanted to see additional information on the program history (old proposals, negation memorandum, technical & audit reports, etc.) where would you look?*

Chapter Vignette

Basic Cost Concepts and Planning Assumption

Andrew feels he is ready to begin his review, but Kay tells him, “not yet.” “You need to step back and look at the total situation before you proceed. I want you to understand some basic concepts before you go on. First, you need to understand the importance and impact of the offeror's basic planning assumptions. Second, you need to understand the concept of ‘Should-Cost’ and how it can be applied. Finally, you need to understand what cost risk means and its effect on basic contract decisions.” While Andrew is anxious to get started, Kay knows what she is talking about, so he begins by trying to figure out what she means by planning assumptions.

Course Learning Objectives

At the end of this chapter, you will be able to:

- identify the offeror's planning assumptions, including contingencies
- develop positions on the proposed work design
- identify the level of risk inherent in the offeror's cost estimate and methods for mitigating risks

Chapter Overview

Overview In this chapter, you will see that the offeror's cost estimate and the resulting work plan are based on various assumptions and perception of the cost risk. When performing cost analysis, you need to identify and analyze these assumptions, contingencies, and risks.

You should actively scrutinize the offeror's work practices and facilities for economy, efficiency, and possible improvements. Performing a should-cost analysis provides you the data upon which to base the Government's negotiation positions for such improvements.

The offeror's estimated cost also reflects the offeror's perception of the cost risk involved in the work. The offeror's perception of risk will be reflected in the proposed cost. In jobs with little risk, this cost may be negligible. In jobs with very high risk, the added cost risk could be very expensive for the Government. You need to identify the risk involved in the work and manage it by apportioning the risk appropriately between the offeror and the Government.

The results of your analysis will significantly impact the Government's prenegotiation position, the final price paid, and potentially the overall success of the contracted project. How your recommendations will impact the Government position is covered in chapter 13, Preparing for Negotiations.

Maps in this Chapter

This chapter contains the following maps:

5.1	OFFEROR'S PLANNING ASSUMPTIONS.....	5-5
5.1.1	Identify Planning Assumptions.....	5-6
5.1.2	Analyze Offeror's Assumptions.....	5-8
5.1.3	Analyze Offeror's Contingencies.....	5-13
5.1.4	Use a Structured Breakdown to Relate Costs.....	5-15

(continued on next page)

Chapter Overview

(continued)

Maps in This Chapter (continued)	5.2	SHOULD-COST PRINCIPLES IN OBJECTIVE DEVELOPMENT	5-17
	5.2.1	Identify Causes of Inefficient or Uneconomical Performance .	5-18
	5.2.2	Review Potential Sources of Data on Inefficient or Uneconomical Performance	5-21
	5.2.3	Review Formal Should-Cost Analyses.....	5-22
	5.3	COST RISK AND RELATED CONTRACT DECISIONS....	5-25
	5.3.1	Identify Principal Sources of Cost Risk.....	5-26
	5.3.2	Assess the Level of Risk	5-28
	5.3.3	Select Contract Type To Reduce Exposure To Risk	5-31
	5.3.4	Provide Clear Contract Requirement.....	5-38
	5.3.5	Use Government Furnished Property to Manage Cost Risk...	5-39
	5.4	USING YOUR WORK DESIGN ANALYSIS	5-41
	5.4.1	Using Your Work Design Analysis.....	5-42

5.1 OFFEROR'S PLANNING ASSUMPTIONS

Section Overview

Overview	<p>In this section, you will begin to identify and analyze the offeror's planning assumptions, including contingencies, as the first step in your cost analysis. Accurate identification and analysis are important because such assumptions and contingencies form the base upon which the offeror has planned the required work and estimated the costs.</p> <p>Since you CANNOT analyze the total cost figure for the offeror's proposal, you need to break the cost down to an analyzable level. FAR Table 15-2 requires the offeror to provide a supporting breakdown for each element of cost, consistent with the offeror's accounting system. The breakdown should lead the analyst to the <i>work packages</i> used as a basis for estimate development.</p>
Maps in this Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Identify Planning Assumptions• Analyze Offeror's Assumptions• Analyze Offeror's Contingencies• Use a Structured Breakdown to Relate Costs

5.1.1 Identify Planning Assumptions

Introduction	<p>When an offeror develops a cost estimate for a proposal, it is based on certain planning assumptions. Because these assumptions are basic to the development of the cost estimate, begin your cost analysis by identifying the offeror's assumptions.</p>
Basic Perspectives of Assumptions	<p>You will find that each of the offeror's assumptions can be categorized as one of two basic perspectives:</p> <p>1. The future will be the same as the past.</p> <p>If the offeror has taken the perspective that the future will be the same as the past for an assumption, then the offeror will use historical cost data to estimate future costs.</p> <p>2. The future will be different from the past.</p> <p>If the offeror has taken the perspective that the future will be different from the past, then the offeror will devise some factor by which to adjust the historical cost data when calculating the future costs.</p>
Example	<p>To illustrate the use of historical data for projecting the future:</p> <p>Let's assume that an offeror is estimating the cost to manufacture product A2. This company has extensive experience manufacturing a similar item product A1.</p> <p>If the offeror believes that A2 will cost the same as A1 to manufacture, then a proposal using A1's costs projected into the future for product A2 would be appropriate—<i>Perspective 1: The future will be the same as the past.</i></p> <p>If, on the other hand, A2 is more difficult and costly than A1, the offeror may make a judgement that A2 is twice as costly as A1. In this case, the proposal might use A1 historical cost projected into the future, but double the historical cost—<i>Perspective 2: The future will be different from the past.</i></p>

(continued on next page)

5.1.1 Identify Planning Assumptions

(continued)

Identify and
Review
Planning
Assumptions

When identifying planning assumptions:

1. Review the offeror's proposal and identify the planning assumptions.

The offeror's proposal may have a single overall statement of the assumptions used in planning. However, if the assumptions are not presented in one place, you **MUST** carefully review the proposal to find them. Often individual estimates will include statements about the assumptions and factors on which the estimate is based.

2. Have the planning assumptions reviewed by knowledgeable personnel to determine if they are *realistic and consistent*, and *how they affect the proposal*.

Have the technical assumptions analyzed in a technical analysis and the financial assumptions analyzed in an audit analysis.

5.1.2 Analyze Offeror's Assumptions

Introduction

After identifying the assumptions underlying the offeror's cost estimate, you need to analyze them to determine if they are valid and reasonable.

You will find that the types of assumptions that an offeror will make in developing the cost estimate generally involve:

- anticipated problems
- anticipated technology change
- potential interruptions and shortages
- inflation

The offeror will try to estimate the cost impact of any of these assumptions and factor that impact into the cost estimate.

Anticipated Problems

When calculating the estimated cost of a proposal, an offeror will try to anticipate potential problems in the project that will influence the cost. Such problems may be technical, managerial, environmental, etc., in nature.

If the offeror believes that a problem is likely to occur, the offeror will add the estimated cost impact of that problem to the total proposed cost.

Example

Consider the assumptions and their associated costs that might be included in an offeror's proposal to use highly toxic chemicals in the manufacture of rocket fuel:

- cost of locating a plant site where a local community would allow such a facility
 - possible higher wages and employee benefit costs due to the danger associated with the product
 - costs associated with complying with Occupational Safety and Health Administration (OSHA) regulations
 - cost of waste disposal
 - cost of storage of hazardous product
-

(continued on next page)

5.1.2 Analyze Offeror's Assumptions

(continued)

Analyzing the Assumption of Anticipated Problems

When analyzing the offeror's assumption of an anticipated problem, answer the following questions:

- ***Is the assumption realistic?***

If answering this question is beyond your technical expertise, request a technical analysis. In your request for the technical analysis, specifically ask for an assessment of the likelihood of the problem occurring.

- ***Is the assumption consistent with the rest of the proposal?***

For example, check the technical proposal to see if it indicates that a previous production problem or limitation has been solved, and then check against the cost proposal to determine whether it still contains a cost estimate based on past production historical costs.

- ***How much should it reasonably cost to handle the problem?***

Again, advice from technical professionals may be required to establish a reasonable cost.

Anticipated Technological Changes

Technological change can take the form of **product change** or **process change**. In this time of rapid technological advancement and with the often long lead times for awarding contracts, an offeror has to anticipate advancements in technology when developing a contract proposal. Also, the proposed work itself may require the offeror to assume a risk associated with developing new technology. In both cases, there is a cost involved with the risk of anticipating technological change. Offerors may add this cost as well to the total estimated cost of the proposal.

Example

A proposal is received for a new control subsystem that will replace and improve the existing control subsystem in an automated material handling system. The existing control subsystem has had significant problems because of failed attempts to advance the state-of-the-art technology. The offeror is proposing to use the current subsystem cost history as a basis for projecting the cost of implementing technological change in development and production of the new control subsystem. Scrap and a number of other factors are affected by this assumption.

(continued on next page)

5.1.2 Analyze Offeror's Assumptions

(continued)

Example
(continued)

The Government technical evaluator may have reason to believe that costs associated with the current subsystem are unusually high and that a lower cost, more consistent with other similar projects, would be more appropriate. In this case, the Government's position should reflect the lower estimate for the cost of the change. If the offeror has a sound basis for the higher level of change, the offeror should provide supporting data to the Government for review.

Analyzing
Anticipated
Technological
Change

When analyzing the offeror's proposed cost for an anticipated technological change, answer the following questions:

- ***Will the change occur?***

If the technology does not exist and the change is desirable, what is the probability of accomplishing the change given the current state of the art?

- ***When will it occur?***

If the change is possible, what is the probability that it occur in time to benefit the proposed contract?

- ***What will be the cost/benefit to the proposed contract?***

There may be ways of completing the contract that do not require technological change. Existing products and methods may be quite satisfactory. Alternatively, other firms may have already developed the required technology. Subcontracting would be more logical than paying for the reinvention of existing technology.

Typically, answers to these questions are based on knowledge about the state-of-the-art of the technology and knowledge of the history of similar advancements. As with so many issues in cost estimating, the answers are based on a combination of historical information and judgement.

(continued on next page)

5.1.2 Analyze Offeror's Assumptions

(continued)

Anticipated Interruptions and Shortages

There are circumstances on a project when a contractor's schedule may be temporarily interrupted. Some common causes of interruption:

- Failure by the Government, another contractor, or a subcontractor to furnish an item necessary for continued performance
- Interference by other contractors working on the same project
- Material shortages

Any interruption, of course, will result in a cost to the offeror, so the offeror will try to anticipate the likelihood of interruptions and include them in the total proposed cost. Your cost analysis will need to determine how many of these interruptions may reasonably occur and the costs that would be incurred by the contractor as a result of these interruptions.

Example

The offeror is proposing electrical rewiring on five reserve cargo ships. On a similar contract, the offeror experienced several work interruptions due to conflicting tasks with other contractors. Therefore, the offeror has calculated the costs in the current proposal based on experience from the earlier contract. The Government engineer has reason to believe that the anticipated number of interruptions is correct. Since the *number* of interruptions appears reasonable, your cost analysis should focus on the reasonableness of the offeror's anticipated costs.

Analysis of Anticipated Interruptions and Shortages

When the offeror projects an interruption or shortage in the planning assumptions, you need to ascertain if there is a way to avoid the interruption, what the impact will be if the problem does occur and what is a reasonable cost for such an occurrence. In such cases, ask the following questions:

- *Are the interruptions or shortages avoidable? Will actions taken to avoid them add to the cost?*
- *Can the Government customer tolerate the delay(s) due to the interruption or shortages?*
- *Are there other available products that can be used as acceptable substitutes?*
- *Is the cost projected by the offeror reasonable?*

(continued on next page)

5.1.2 Analyze Offeror's Assumptions

(continued)

Inflation	When the contract performance is expected to extend beyond a few months, the offeror may include assumptions about inflation in the cost of the proposal. Again, your analysis must determine if the assumptions are reasonable.
-----------	--

Inflation Indexes	There are various indexes available that report or predict inflation. Some of the better known, and often used indexes include:
----------------------	---

- Consumer Price Index (CPI)
- Producer Price Index (PPI)
- DRI/McGraw (DRI) Cost Information Services

The development and application of index numbers and economic projections in the analysis of inflation assumptions and projections will be considered in Chapter 6.

5.1.3 Analyze Offeror's Contingencies

Introduction

Just as you identified and analyzed other assumptions in the offeror's proposal, you must also identify and analyze special assumptions called *contingencies*.

In planning a project, there are possible situations that would affect the cost of the project *if they occurred*, but the planner cannot say with any certainty that these situations will occur. Moreover, the planner might not be able to forecast the probable impact on costs if the situations do occur. The offeror may include contingency provisions in the proposal for these costs, so that, if the contingencies occur, the costs will be covered by the contract.

Categories of Contingencies

FAR 31.205-7

Contingencies fall into three categories:

1. Contingencies that arise from presently known, existing conditions, WHEN estimators can reasonably forecast the cost impact.

For example, anticipated costs of rejects and defective work may be contingencies in this category.

These contingencies should be included in the estimates of future cost to provide the best estimate of performance costs.

2. Contingencies for which estimators CANNOT reasonably forecast the cost impact (whether or not arising from presently known conditions).

For example, the results of pending litigation and other general business risks may be contingencies in this category.

These contingencies are to be excluded from cost estimates under the several items of cost, but should be disclosed separately, and should include the basis of which each contingency was computed to facilitate the negotiation of appropriate contractual coverage.

What if the offeror is NOT agreeable to separate contract coverage of the contingency? If the offeror in discussions wishes to base the total price in part on the cost for such a contingency, you might concede the cost if not significant to overall price (especially if the your concession is part of a tradeoff for another concession favorable to the Government).

(continued on next page)

5.1.3 Analyze Offeror's Contingencies

(continued)

Categories of
Contingencies

(continued)

3. Contingencies added to historical costs are NOT normally allowable.

For example, the offeror adds 5 percent of manufacturing direct labor hours for manufacturing support engineering. The purpose of the engineering contingency is to handle any production design problems. If you are analyzing a project where the work has been completed, then any production design problems, and the associated manufacturing support engineering costs, would be reflected in the actual historical costs. You **WOULD NOT** add an additional 5 percent for what has already taken place!

These contingencies should normally be disallowed. However, under very limited conditions, such as contract terminations, you may recognize minor costs in order to hasten settlement.

Analyzing
Contingencies

When analyzing the offeror's contingencies, answer the following questions:

- ***Is the contingency realistic?***

If answering this question is beyond your technical expertise, request that technical and audit personnel specifically assess the contingency.

- ***Is the contingency consistent with the rest of the proposal?***

Check the related portion(s) of the proposal to see that all are consistent.

- ***How much should it reasonably cost to handle the contingency?***

Obtain and analyze a separate breakout of the impact on direct costs.

5.1.4 Use a Structured Breakdown to Relate Costs

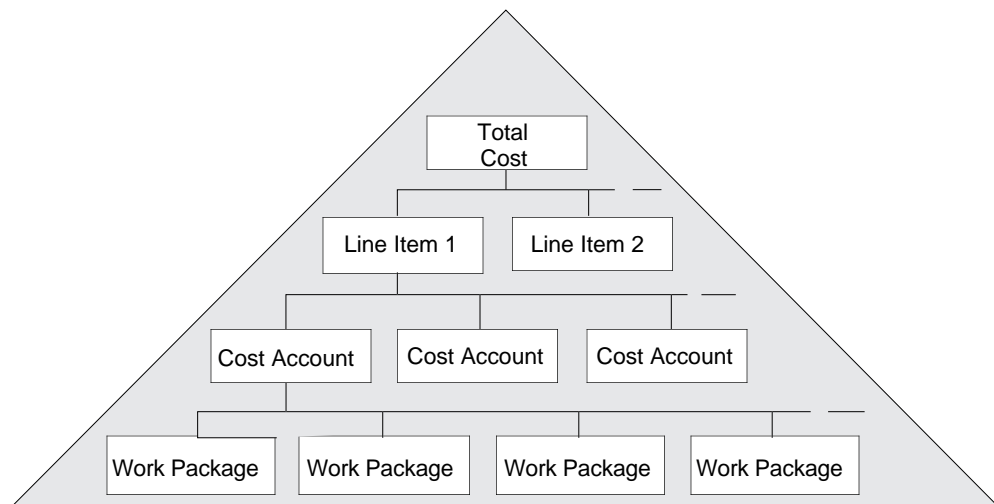
Introduction

You cannot do a cost analysis if you know nothing more than proposed total cost. You need a breakdown of the total cost into its basic elements. The offeror should do this for you by describing the structure used in preparing the proposal.

Use the offeror's structure as a guide to lead you from the total contract cost through increasing levels of detail to the most basic element—the work package. A work package defines the work required by a specific worker or group of workers to accomplish a task. Offerors prepare their cost estimates most often at the work package level.

Proposal Structure

The offeror's cost breakdown should resemble a pyramid. Total contract cost is at the top. Each lower level breaks the system down into subsystems and components until the breakdown reaches its lowest level—the work package.



5.1.4 Use a Structured Breakdown to Relate Costs

(continued)

Work Package	The work package is the foundation on which costs are estimated and incurred. Work packages are detailed short-span tasks identified and controlled in assigning work within the offeror's organization and accomplishing work required to complete a contract.
--------------	---

A work package has the following characteristics:

- represents unit of work at level where work is performed
- work contents are clearly distinguished from all other work packages
- is assignable to a single operating organization
- has objective start and completion events which:
 - are representative of physical accomplishment
 - can be scheduled to calendar dates
 - can be objectively measured
- has a budget expressed in terms of dollars, work-hours, or other measurable units
- its size and duration are limited to relatively short spans of time to minimize the work-in-progress effort

“Road Map” between Total Cost and Work Packages	
--	--

The cost breakdown structure should provide you with a “road map” showing the connections from the total cost to the work packages, and within the work package to the tasks and subtasks, where the proposed effort can be analyzed.

The “road map” from the total contract cost to the work packages should be clearly outlined in the proposal. If it is NOT and you CANNOT determine the structure from the information provided, you should require the offeror to provide a clear summary of how total cost and line item costs relate to individual work packages.

5.2 SHOULD-COST PRINCIPLES IN OBJECTIVE DEVELOPMENT

Section Overview

Overview

FAR 15.801

Cost analysis is the “the review and evaluation of the separate cost elements and proposed profit of (a) an offeror’s or contractor’s cost or pricing data and (b) the judgmental factors applied in projecting from the data to the estimated costs in order to form an opinion on the degree to which the proposed costs represent **what the cost of the contract should be, assuming reasonable economy and efficiency.**”

FAR 15.805-3

Hence, by definition, “*should cost*” analysis should always be the basis for your prenegotiation objectives on individual elements of cost and on total estimated cost . In particular, contracting officers shall ensure that “the effects of inefficient or uneconomical past practices are not projected into the future.” A should-cost analysis attempts to identify such practices and recommend improvements.

Should-cost analysis can range from techniques one can use on any proposal to a formal should-cost analysis. Should-cost techniques can and should be applied to individual cost analyses even where there is NO requirement for a formal should-cost study.

Maps in this Section

This section includes the following maps:

- Identify Causes of Inefficient or Uneconomical Performance
 - Review Potential Sources of Data on Inefficient or Uneconomical Performance
 - Review Formal Should-Cost Analyses
-

5.2.1 Identify Causes of Inefficient or Uneconomical Performance

Introduction

In your should-cost evaluation, you will identify inefficient or uneconomical methods and performance in the offeror's proposal and operations. However, to do so, you must understand where to look and what to look for.

Areas you can check for improvements are:

- tasks and subtasks
 - methods
 - facilities
 - equipment
 - hardware and software
 - management and operating systems
 - other aspects of performance
-

Tasks and Subtasks

Examine the tasks and subtasks within the work packages of the contractor's operations to see if they are necessary and if they really add anything of value to the final product.

For example, production facilities often have repetitive tests of the same product performed by line managers and various quality assurance personnel. Even with all of this repetitive testing, defective units still get through. Some of these tests can be eliminated with more reliance on worker application of statistical process control techniques. The result could be improved quality and reduced cost.

Methods

Improvements in existing methods or promoting new methods are good areas for should-cost analysis. When analyzing production contracts, should-cost involves questioning the offeror's proposed manufacturing techniques and technologies. The current interest in statistical process control to reduce the range of variation in processes is a good example of how some organizations are attempting to improve methods.

5.2.1 Identify Causes of Inefficient or Uneconomical Performance

(continued)

Facilities

Look to see if a change in facilities or facility layout has should-cost potential. In simple terms, a cost benefit analysis compares the savings from the change with the cost of making the change. If the costs are less than the savings, then the change is worth pursuing.

Example: The cost of fabricating a certain component for a system could be reduced by \$150,000 per production system if a new \$1,000,000 facility were placed in operation. The current proposal is for six systems and the facility would NOT be operational until the fourth system. However, the total program calls for production of 38 systems over the next five years.

Is it cost effective to invest in the new facility?

If only the six remaining systems under the current contract are considered, implementing the new facility would raise costs by \$100,000.

$$\begin{aligned} (\text{Savings per Unit} * \# \text{ Units}) - (\text{Cost of Change}) &= \text{Net Gain/Loss} \\ (\$150,000 * 6) - \$1,000,000 &= - \$100,000 \end{aligned}$$

However, if the Government does award a follow-on contract to this firm, the offeror would realize a net savings of \$4,700,000 for producing all 38 systems (6 under the remaining contract + 35 under a new contract).¹

$$\begin{aligned} (\text{Savings per Unit} * \# \text{ Units}) - (\text{Cost of Change}) &= \text{Net Gain/Loss} \\ (\$150,000 * 38) - \$1,000,000 &= \$4,700,000 \end{aligned}$$

Conclusion: Yes. If all 38 systems are produced by this firm, the savings would substantially outweigh the cost of the investment.

Notice: While NOT considered in this example, net present value analysis and cost of money adjustments should also be considered.

Equipment

You should also look at equipment for inefficient or uneconomical performance. Equipment may be inefficient, out of tolerance, or expensive and time consuming to maintain. The rate of production may be significantly greater or less than the optimum rate for the equipment. In any case, you should review the total shop loading for a machine or work station, NOT just the current proposal.

(continued on next page)

¹How this cost would be charged is the subject of FAR 31.205-11, "Depreciation."

5.2.1 Identify Causes of Inefficient or Uneconomical Performance

(continued)

Hardware and Software

Automation resources can be categorized as direct cost-specific to the program, or overhead—general purpose. Both categories are worth attention. Check both categories for inefficient and uneconomical use.

Especially look for duplication of automation resources, as this is a common finding. For example, the data automation department has the capability to perform certain tasks. Department A uses its own, non-networked personal computers for those tasks. Department B uses computers on a local area network for the same tasks but with incompatible software. Obviously, there is room for improvement and cost reductions. Periodic Government-conducted automated data processing equipment (ADPE) reviews can be very helpful in analyzing such situations.

Management and Clerical Functions

Since business automation has reduced the need for many clerical and mid-level management functions, these functions are good targets for improvement. Look for ways to eliminate nonvalue-added functions and shorten the line of communication and authority.

Other Aspects of Performance

Depending on the type of should-cost, the specific circumstances of the acquisition, and contractor peculiar practices, other aspects of the total environment may deserve attention. While these aspects may differ greatly, some of the possible candidates include test plans, business forecasts, staffing plans, capital investment projections, and anything else that has the potential of significantly affecting the should-cost environment.

5.2.2 Review Potential Sources of Data on Inefficient or Uneconomical Performance

Review Reports and Surveys	By reviewing reports and surveys prepared by Government technical personnel, pricing personnel, and auditors, you can identify systems that have been shown to be inefficient or uneconomical. The findings of these reports will give you ideas about what systems and components are likely candidates for investigation, how the efficiency of a system is demonstrated, and the solutions that were devised.
Technical Reviews	<p>The following is a list of technical reviews available:</p> <ul style="list-style-type: none"> • technical analyses of cost proposals • technical reviews • preaward surveys • zone evaluations • evaluation assessments performed by Defense Plant Representative Offices • performance assessment reviews • price analysis reports on the same or similar items where should-cost techniques were employed • cost monitoring reviews • Automated Data Processing Equipment (ADPE) reviews
Audit Reviews	<p>The following are some of the audit reviews that may be useful:</p> <ul style="list-style-type: none"> • audits on proposals for the same or similar items • operations audits • compensation review audits • joint reviews under a Cost Monitoring Plan • special audits performed by local, regional, or headquarter's audit teams
Formal Should-Cost Analyses	If available, review any reports from formal should-cost analyses on the offeror. The next section describes such analyses and offers advice on when to initiate them.

5.2.3 Review Formal Should-Cost Analyses

Introduction

FAR 15.810

You can use should-cost techniques in your cost analysis of any contract. However, for a major production program involving large costs, a formal should-cost analysis with a full team of experts may be warranted. The potential pay-off in cost reduction from such a formal analysis may be substantial, and may more than offset the cost of the analysis. Also, the information and findings produced by formal should-cost analysis have historically attracted a great deal of attention at all management levels in the Government. The purposed of this section is provide a brief introduction to the concept of formal should-cost studies.

Objective of Should-Cost Analysis

The objective of should-cost analysis is to produce both immediate and long-range positions on improvements in the contractor's economy and efficiency by evaluating and challenging the contractor's existing methods, materials, facilities, workforce, or management and operating systems. Improving the contractor's economy and efficiency will reduce the contractor's costs, which can be passed along as savings to the Government.

In addition, by providing a rationale for any recommendations and quantifying their impact on cost, the Government will be better able to develop realistic price objectives for use in negotiations.

When to Initiate a Formal Analysis

Consider initiating a formal should-cost analysis when:

- the contract is for a major system acquisition
- some initial production has already taken place
- the contract will be awarded on a sole-source basis
- there are future year production requirements for substantial quantities of like items
- the items being acquired have a history of increasing costs
- the work is sufficiently defined to permit an effective analysis and major changes are unlikely
- sufficient time is available to plan and conduct the should-cost analysis adequately
- personnel with the required skills are available or can be assigned for the duration of the should-cost analysis

(continued on next page)

5.2.3 Review Formal Should-Cost Analyses

(continued)

Should-Cost Team Members

A formal should-cost analysis is performed by an integrated team of contracting, contract administration, pricing, audit, and engineering experts. By bringing all these experts together in one team, you facilitate and enhance the analysis by obtaining all of their perspectives at one time. This allows for potential problems to be pursued in greater depth.

While the specific organization of the should-cost team differs from review to review, there are two general organizational schemes:

- production program should-cost team
- overhead should-cost team

Production Should-Cost Teams

The *production program should-cost team* looks at the direct cost and manufacturing aspects of the proposal. It is commonly organized into six subteams:

- operations
- engineering
- management
- material
- pricing
- manufacturing and quality assurance

Overhead Should-Cost Teams

The *overhead should-cost team* looks at the indirect costs. It is usually organized into four subteams:

- sales/base team
- one or more indirect labor teams
- non-labor cost team
- integrating team

The integrating team facilitates the flow of results to the cognizant Administrative Contract Officer tasked with negotiating a Forward Pricing Rate Agreement that will implement the results of the review.

(continued on next page)

5.2.3 Review Formal Should-Cost Analyses

(continued)

Should-Cost
Analysis
Report

At the end of the should-cost analysis, each team contributes its findings to a final report. This report is sent to the contracting officer, who uses it to formulate and substantiate Government negotiation positions.

Normally, an out-brief reviewing major finding is held with the contractor. An out-brief does NOT deal with all the findings in depth but instead provides the contractor an overview of major areas of concern. Specific recommendations for correction of identified deficiencies are NOT given to the contractor.

Correction or
Disposition
Agreements
with
Contractor

After completing negotiations using the results from a formal should-cost analysis, the contracting officer MUST provide the ACO a report of any identified uneconomical or inefficient practices, along with a report of correction or disposition agreements reached with the contractor. The contracting officer MUST also establish a follow-up plan to monitor the correction of the uneconomical or inefficient practices.

5.3 COST RISK AND RELATED CONTRACT DECISIONS

Section Overview

Overview	<p>In this section, you will learn to identify the types of risks inherent in an offeror's cost estimate and how these risks affect the offeror's estimate.</p> <p>While you may NOT be able to eliminate all risk from a contract, you can reduce the Government's exposure to risk. In this chapter, you will learn about three of the methods (among many) that you can use to mitigate risk:</p> <ul style="list-style-type: none">• by the type of contract you select• by specifying the contract requirement clearly• by providing Government furnished property
Maps in this Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Identify Principal Sources of Cost Risk• Assess the Level of Risk• Select Contract Type To Reduce Exposure To Risk• Provide Clear Contract Requirements• Use Government Furnished Property To Manage Cost Risk

5.3.1 Identify Principal Sources of Cost Risk

Introduction

When the offeror considers entering into a contract with the Government to perform a job, the offeror will consider the risk of the various contract obligations.

The risk to the offeror can be viewed from several perspectives:

- **investment risk**—the risk in recovering the money invested by the offeror to perform the job
- **economic risk**—the risk in earning a reasonable profit on the investment, especially when compared to other possible investments
- **performance risk**—the risk in successfully performing the work required by the contract

You can be assured that, as long as there is a reasonable expectation of success and the profit or other payoff is great enough to warrant taking the risk, there will be contractors available to take on the work. However, if the outcome is too uncertain and the rewards too little for the risk involved, you might NOT find a responsible contractor to take the job.

Investment Risk

In order to perform on a contract, the offeror may have to plan to make costly investments for such things as facilities, equipment, and materials. The offeror will need a reasonable assurance that these investments will be recouped from contract performance. If the offeror feels that the investments are for facilities, equipment, and materials that can only be used for a specific Government product, then the offeror may conclude that the investment risk is too great. Or, the offeror may choose to avoid such investment risk by proposing a less efficient use of manual labor, instead of investing in more efficient—and more expensive—facilities and equipment. (One of the reasons frequently given for the high proportion of manual labor in Government contracts, compared to commercial business, is the potential for loss caused by sudden changes in Government requirements.)

(continued on next page)

5.3.1 Identify Principal Sources of Cost Risk

(continued)

Economic Risk

Economic risk is the probability of regaining one's money with a reasonable profit from an investment versus not making a profit, or, even worse, losing the investment. The higher the risk of an investment, i.e., the higher the probability of losing the investment, the higher the potential profit must be in order to persuade an investor to take the risk. A low profit may be acceptable when a low risk is involved.

Ask yourself—would you rather invest your money in a Government contract with a projected return on investment of 3 percent at best and a risk of sudden changes in Government requirements, or put the same money into Government securities at a 6.5 percent return on investment?

Remember, the negotiated profit or fee generally does not equal the contractor's likely return on investment. First, the actual profit or fee varies from the negotiated profit or fee to the extent that actual costs vary from the estimates on which the negotiated profit or fee is based. Second, contractors have to cover unallowable costs (such as interest) out of the negotiated profit or fee.

There are more uses for investment capital than there is capital to invest. Investments, including Government contracts, must compete for a limited amount of investment capital. Potential offerors will consider both the return and the risk involved when deciding whether to submit a proposal. High risk should hold the potential for a high return. A low return may be acceptable when a low risk is involved.

Performance Risk

Performance risk is the potential difficulty in successfully performing the work required by the contract. The cost that an offeror will estimate for a proposal depends on the offeror's assessment of the risk involved in performing the contract work. If the work is difficult and requires greater effort to accomplish with a relatively high risk of failure or defective units being produced, then this risk will be weighed and reflected in a higher estimated cost.

5.3.2 Assess the Level of Risk

Introduction

As you begin your analysis of the offeror's proposal, make your own independent assessment of contract-related risk. In your assessment, consider (1) risks inherent in the contract requirements, (2) the offeror's assessment of risk, and (3) the facts supporting that assessment. If the risk identified by the offeror is real, you should consider the methods of mitigating risk that are described in the next section. If the risk identified by the offeror is NOT real, you **MUST** be prepared to explain the errors in the offeror's analysis of risk. If the offeror has failed to identify an area of significant risk, you **MUST** assure that the offeror is aware of the risk possibilities.

What are the inherent risks?

As you review contract requirements, consider the risks involved. Every contract has risks. However, some are more risky than others.

For example, in estimating the material required to produce any product, there will be risk involved. Parts may fail and production errors may make parts unusable. This risk may be extremely high if the contract requires extremely fragile materials or imposes tighter tolerances than for like commercial products. The offeror's proposal will likely include a contingency estimate to cover the risk involved.

If you identify risks that the offeror has NOT considered in the proposal, assure that the offeror understands the possibility of risk.

What is the offeror's assessment?

The offeror's proposal should identify the risk involved with contract performance and how that risk will affect contract price.

Example. In estimating scrap, the offeror should describe the causes of scrap and how the scrap was estimated. The proposal should include all the facts that the firm used in developing the estimate as well as other available facts that could reasonably be expected to affect the estimate. (Specific techniques for estimating scrap requirements are covered in Chapter 7.)

(continued on next page)

5.3.2 Assess the Level of Risk

(continued)

Has the offeror properly assessed the risk?

Compare your assessment of risk with the offeror's analysis of risk. If the offeror projects significant risk, do you concur in that assessment? If you do, you should consider ways of mitigating that risk. If you do NOT concur, you **MUST** be able to explain why your analysis differs from the offeror.

An offeror might believe that anything that can go wrong will go wrong. A proposal based on such a belief will include estimated costs to cover all possible risk. You **MUST** analyze the facts involved to determine if the offeror's assessment on the probability of problems is reasonable. In your assessment, you should consider both the probability of the problem occurring and the cost involved if it does occur.

In assessing the risk involved, you will normally rely on the answers to two questions:

- ***What information is available to the offeror?***

If the item has never been produced before, there may be great uncertainties about the probable scrap rate. Substantial material may be required to replace material lost in producing units that fail critical tests.

If an item has been produced several times, there may still be production errors that result in scrap. However, with the increased production experience, the offeror should be better able to estimate and control the risks involved.

- ***What is the offeror doing to control risk?***

Knowing that there is a production problem is NOT enough. The offeror should have a plan of action to correct the problem. Some problems can be resolved using existing technology and methods. Others are beyond the “state of the art” and may require greater effort to correct.

(continued on next page)

5.3.2 Assess the Level of Risk

(continued)

Mitigate Risk

If risk is real, related costs **MUST** be considered in developing your negotiation positions. If the costs are substantial, you should consider ways of mitigating the risk involved. Three ways of mitigating risk are considered in the next section: (1) selection of appropriate contract type, (2) clarification of contract requirements, and (3) use of Government furnished property. Other changes in terms and conditions might also mitigate various types of risks. Among other potential changes that might reduce the risks inherent in the work:

- Shifting from Government-unique to commercial specifications
- Using commercial rather than Government-unique warranties
- Providing financing to the contractor, either in the form of advance or progress payments
- Extending delivery schedules to match market norms
- Agreeing to FOB Origin rather than FOB Destination delivery points
- Using option or multiyear terms when the work will require a substantial capital investment by the contractor

However, before making any such changes in terms and conditions of the RFP either before or during discussions, consider:

- All costs to the Government entailed by the changes,
- All provisions of the FAR regarding the use of each term and condition, and
- The nature of the discussions. In a sole source environment, you may directly negotiate changes in terms and conditions. In competitive procurements, you may have to amend the RFP and notify other offerors as provided in FAR 15.606.

FAR 15.606

5.3.3 Select Contract Type To Reduce Exposure To Risk

Introduction

Your principal method for controlling cost risk, both to the Government and to the contractor, is to select the proper contract type to suit the risk conditions of the project. This will make the work more attractive to more potential offerors, thereby increasing competition. Increased competition usually helps you get a fairer and more reasonable price. The type of contract you select can also motivate the contractor to perform more efficiently by giving the offeror more control over the amount of profit that can be earned.

Especially in competitive procurements, you should have anticipated risks and selected the contract type that best suits the risks prior to soliciting offers. At times, however, offerors may persuade you (wittingly or unwittingly) that your initial appraisal of the risks lead you to the wrong conclusion about the most suitable contract type for the procurement.

Basic Contract Types

Most contracts fit into two basic types:

- fixed-price
- cost-reimbursement

A *fixed-price* type contract is used when the cost risk to the contractor is low, or well-defined, and the contractor can confidently estimate an accurate cost. This situation applies when the production methods for the contract product are well-established and the costs are well known.

A *cost-reimbursement* type contract is used when the cost risk to the contractor is high, and the contractor CANNOT estimate the cost with reliable accuracy.

When the contract deliverable is still in the development stage, **for example**, production methods are not well-established and the costs are not well-known. If you solicit fixed price offers in the teeth of this much uncertainty, potential offerors may (1) decline to submit offers rather than accept the risk, or (2) “pad” their fixed prices to cover the uncertainties. This is NOT in the Government's interest. The first result decreases competition and reduces the Government's choices. The second result increases the amount of money paid by the Government for the contract deliverable to cover eventualities that may never occur. Soliciting cost reimbursement offers in this case will probably result in more realistic estimates of total cost.

In a *cost-reimbursement* type contract, the contractor is only required to deliver a “best effort” to provide the product. Costs MUST be reimbursed regardless of delivery, as long as they are allowable.

(continued on next page)

5.3.3 Select Contract Type To Reduce Exposure To Risk

(continued)

Select Contract
Type

The following table provides a simple basis for selecting the basic contract type.

IF COST RISK IS...	SELECT...
low or well-defined	Fixed-Price Contract
high or poorly defined	Cost- Reimbursement

Fixed-Price vs.
Cost Type
Contracts

There are different types of contracts within both the fixed price and cost-reimbursement categories. Each type handles the cost risk differently. You will want to select the contract type that best meets the cost risk situation of a particular project.

On a long-term project, the contract needs may change as project stages progress. For example, a long, development project for a new product may pass through several stages from concept to full-production. The cost risks involved may change as the product development evolves. In the very early stages, when the focus is on research and development, the Government should assume cost risk through the use of cost-reimbursement contracts. As the product reaches full production, where cost estimates are well defined, the cost risk should be shifted more to the contractor through the use of fixed-price contracts.

The cost risk sharing features are described below for six of the most common contract types:

- Firm fixed-price (FFP)
- Fixed-price economic price adjustment (FP-EPA)
- Fixed-price incentive firm (FPIF)
- Cost-plus-incentive fee (CPIF)
- Cost-plus-award fee (CPAF)
- Cost-plus-fixed fee (CPFF)

(continued on next page)

5.3.3 Select Contract Type To Reduce Exposure To Risk

(continued)

Cost Risk and
Contract Type

Use the following table to determine the relationship of the cost risk and the most common contract type. A detailed chart of contract characteristics is given at the end of this chapter.

COST RISK AND CONTRACT TYPE						
Cost Risk	High _____ Low					
Requirement Definition	Poorly-defined Requirement			Well-defined Requirement		
Production Stages	Concept Studies & Basic Research	Exploratory Development	Text/ Demonstration	Full-scale Development	Full Production	Follow-on Production
Contract Type	*	CPFF	CPIF, FPIF	CPIF, FPIF, FFP	FFP, FPIF, FP-EPA	FFP, FPIF, FP-EPA

* varied types of cost reimbursement contracts

FFP

FAR 16.202

Use a firm fixed-price (FFP) contract when the contractor is able to accurately estimate the cost of the work called for in the contract, and the cost risk to the offeror is therefore very low.

A firm fixed-price contract places ALL cost risk on the contractor. It requires the Government to pay a specified price when the items specified by the contract have been delivered and accepted. The price for the original work is NOT adjusted after contract award regardless of the contractor's actual cost experience.

FP-EPA

FAR 16.203

Use a fixed-price with economic price adjustment (FP-EPA) type of contract when economic conditions beyond the offeror's control might affect costs significantly. For example, an FFP contract would NOT cover the offeror's cost risk sufficiently if wages or prices in the relevant labor or material markets are extremely unstable. In this case, you would need a contract that allows for adjustments due to changes in economic conditions.

(continued on next page)

Select Contract Type To Reduce Exposure To Risk

(continued)

FP-EPA

(continued)

Economic price adjustment (EPA) clauses are designed to cope with economic uncertainties that would threaten long-term, fixed-price arrangements. Such clauses provide for BOTH price increases and decreases to protect the Government and the contractor from the effects of economic changes.

If such clauses are NOT used, you can expect contractors to include contingency allowances in their proposals to eliminate or reduce the risk of loss. Including such contingency allowances in contract prices is NOT a good solution for either the contractor or the Government. The contractor may be hurt if the changes exceed the estimate, and the Government may pay unreasonably high prices if the contingency does NOT materialize.

FPI

FAR 16.204

In circumstances where cost uncertainties still exist, such as the first production run of a completely designed and tested prototype product, the offeror will still have cost risks. To the extent that these risks are controllable by the offeror, you may need to give the offeror incentive to control costs. Use a fixed-price incentive (FPI) contract to do this.

FPI contracts include the following elements:

- target cost
- target profit
- ceiling price (the maximum dollar amount that the Government will pay for the deliverable regardless of actual costs or profit).
- underrun and overrun sharing formulas

Costs under target are shared according to the share ratio established in the *underrun* sharing formula. Costs over target are shared according to the *overrun* sharing formula until the contractor's share of incurred costs and profit equal the ceiling price. This point is known as the Point of Total Assumption (POT). At the POT, any additional cost is subtracted dollar for dollar from the contractor's profit. In effect, at the POT, the contract risk sharing shifts completely to the contractor as in a firm fixed-price contract.

(continued on next page)

5.3.3 Select Contract Type To Reduce Exposure To Risk

(continued)

CPIF

FAR 16.304

When the contract calls for such risky ventures as the development and testing of a new product, the offeror's risk may be too high for any fixed-price type contract. Since you still want to motivate the offeror to hold down costs, you can use a CPIF contract. The basic structure of the CPIF contract includes the following elements:

- target cost
- target fee (expressed in dollars)
- maximum fee (expressed in dollars)
- minimum fee (expressed in dollars)
- sharing formulas

The cost risk on this type of contract is shared by the Government and the contractor according to "sharing formulas" with limits to prevent the contractor from incurring too great a cost risk or receiving too large a fee. These limits essentially create a range around the target cost. If the costs go above the upper limit, the Government is responsible for the costs and the contractor receives at least a minimum fee. If the costs fall below the lower limit, the contractor only receives up to a maximum fee. If the costs fall within the limits, they are shared by the contractor and the Government according to the sharing formulas.

The incentive is effective in the most likely range of cost underrun to overrun. When the maximum or minimum fees are reached, however, the contract converts to a cost-plus-fixed-fee structure. The intention is that the contractor will be motivated to reduce costs, and thus increase the fee in the range where the incentive is effective, but be neither penalized nor unduly rewarded for final costs outside that range.

CPAF

FAR 16.305

The final fee paid to contractors under CPIF contracts is determined by measurable, quantitative criteria, such as costs incurred. In contrast, Cost-Plus-Award-Fee (CPAF) contracts allow Government "fee determination officials" to base the final fee in part on such judgmental factors as "overall quality", "technical ingenuity", and "effectiveness in managing costs". Hence, CPAF formula substitute:

- A "base fee" for the CPIF minimum fee
- "Evaluation factors" for the CPIF sharing formula, and
- An "award fee" that the contractor may earn in part or in whole based on the "evaluation factors".

(continued on next page)

5.3.3 Select Contract Type To Reduce Exposure To Risk

(continued)

CPFF

FAR 16.306

When it is so uncertain how much work might actually need to be performed on a contract that establishment of predetermined targets and incentive sharing arrangements could result in a final fee out of line with the actual work performed, then use a cost-plus-fixed-fee contract.

This type of contract is designed chiefly for use in research or exploratory development or operation and maintenance types of contracts where the level of contractor effort CANNOT be accurately defined. The Government agrees to reimburse the contractor for all allocable, allowable, and reasonable costs incurred during the performance of the contract up to cost limits. Moreover, the Government agrees to pay the contractor a fixed number of dollars above the cost as a fee for doing the work. Fee dollars are fixed at time of contract award and change only if the scope of work changes.

Contract
Selection Table

This table summarizes when to select the five most common contract types.

WHEN...	SELECT...
the offeror can accurately estimate the cost.	FFP
economic conditions that might cost significantly are outside of the offeror's control, but otherwise the offeror can accurately estimate the cost.	FP-EPA
there are cost uncertainties that offeror can have some influence over if they occur.	FPIF
the cost uncertainties are so great that a basic fixed price CANNOT cover the offeror's risk, but you want to motivate offeror to hold down cost and/or achieve performance targets	CPIF CPAF
the uncertainty of the cost could result in too great a risk for the offeror OR an excessively large fee for the Government.	CPFF

5.3.3 Select Contract Type To Reduce Exposure To Risk

(continued)

CPPC

FAR 16.102(c)

BEWARE! The Cost-Plus-Percentage of Cost (CPPC) contract is illegal in federal contracting. The principle is well known but many buyers have unwittingly negotiated CPPC contracts. A CPPC contract can occur in any situation where the contractor is allowed to increase fee by increasing cost, thereby creating a negative cost control incentive. If the answers to the following four questions are yes, you have a CPPC contract.

- Will fee be paid based on a predetermined percentage fee rate instead of an identified dollar value?
- Will the predetermined percentage fee rate be applied to ACTUAL FUTURE PERFORMANCE COSTS?
- Is the contractor's fee entitlement uncertain at the time of contract pricing?
- Will the contractor's fee entitlement increase as performance costs increase?

5.3.4 Provide Clear Contract Requirements Specifications

Introduction

You can influence the inherent risk of a project not only by your selection of contract type, but also by careful specification of contract requirements. Great care must be taken to assure that specifications are clear and accurate. The Government, as well as the contractor, is at risk of nonperformance or substandard contract performance whenever required specifications :

- Are actually impossible to perform, or
- Include conflicting requirements, or
- Are open to widely varying interpretations.

Government and contractor technical personnel must understand that if any specification problems are identified, they **MUST** be brought to the attention of the contracting officer *immediately*. The longer the problems exist without resolution, the greater the risk to both the Government and the contractor. Costly legal actions can result from defective specifications.

Impossible Specifications

In a contract, the writer of the specifications is responsible for their accuracy. If the specifications include drawings so full of mistakes that the product will be impossible to build, or, if built, will not work properly, the writer of the specifications is the responsible party and liable for the resulting additional costs. In your work, since the Government writes the specification, the Government is liable for their correctness.

Conflicting Areas Within Specifications

Conflicting requirements generally lead to changes and rework that result in costly delays. Again, the Government, as writer of the specifications, is responsible and liable for the additional costs.

Specification Open to Interpretation

Make sure the specifications are written carefully enough that they are **NOT** open to misinterpretation. The Government will be held liable, as writer of the specifications, for any ambiguity resulting in additional costs.

5.3.5 Use Government Furnished Property (GFP) To Manage Cost Risk

Introduction Government furnished property (GFP) is one way you can reduce the risk to the contractor and thus make a contract more attractive. For our purposes, GFP includes Government-owned equipment, facilities, and materials provided to a contractor for use on a contract. The GFP is provided to the contractor in order to lower contract costs by shifting investment risk from the contractor to the Government.

Risks Assumed with GFP By providing GFP to the contractor, the *Government accepts risk* in one of several ways:

- **Investment risk**—GFP will shift the risk of NOT recouping the initial capital expense for the property to the Government.
- **Property loss risk**—if the property might be destroyed or be a hazard during or after the contract (e.g. high explosives and rocket fuel production), the Government assumes the risk of property loss.
- **Market risk**—the Government may reduce the risk to the contractor on production materials by providing them as GFP. Using its buying power, the Government can purchase materials at lower prices than are available to the individual contractor, and without as great a risk of changes in market prices. An example of this is special purpose fuels that are often supplied to contractors.

Positive Effects of GFP Government furnished property has positive effects for the contractor and for the Government:

- ***For the contractor***

When GFP is used, the contractor avoids risky investment, high liability costs, and the need for contingencies in the proposal.
- ***For the Government***

GFP also reduces Government risk by providing the Government with the option of moving the GFP from one contractor to another, thus avoiding a high-cost, sole-source situation.

(continued on next page)

5.3.5 Use Government Furnished Property (GFP) To Manage Cost Risk

(continued)

Negative
Effects

The largest negative effect of using GFP is the large amount of administrative effort required on the part of both the Government and the contractor to track, maintain, and dispose of GFP. Large companies have entire departments dedicated to property administration. Smaller firms can easily be overwhelmed by the administrative burden.

If GFP is NOT properly administered, it could be lost or used inappropriately on non-government work allowing a contractor a competitive advantage over other competitors at government expense.

5.4 USING WORK DESIGN ANALYSIS

Section Overview

Overview	As you continue your analysis of the offeror's cost proposal, use the facts that you collected during your design analysis. All parts of the proposal should follow logically from the work design.
----------	---

Base your cost analysis on:

- realistic planning assumptions
- should-cost principles
- Your analysis of the cost risk

Maps in This Section	This section contains the following maps:
----------------------	---

- Using Your Work Design Analysis
-

5.4.1 Using Your Work Design Analysis

Base Cost
Analysis on
Realistic
Planning
Assumptions

All elements of the proposal should be consistent with the offeror's planning assumptions. Question any elements of the proposal that deviate from the assumptions identified.

If you find that the assumptions are NOT reasonable, identify elements of the proposal based on the unreasonable assumption and question related estimates. Unrealistically optimistic cost estimates should be questioned just like unrealistically pessimistic estimates.

If a particular work package is NOT required, exclude the related costs from contract price negotiation positions. If the task is NOT needed, NO cost should be expended to complete it.

Base Cost
Analysis on
Should-Cost
Principles

Identify cases of inefficient and uneconomical contract performance and exclude related costs from your negotiation positions. Should-cost principles should be used in any cost analysis but are essential for any analysis meeting the requirements of FAR 15-810.

Consider Cost
Risk and
Related
Contract
Decisions

If, as a result of your cost analysis, you took action to mitigate cost risk, assure that your negotiation positions reflect that action.

For example, the initial request for proposal indicated that the contract would be firm fixed-price. In the proposal, the offeror identified substantial cost risk and included related costs in the proposal. Your analysis confirmed the cost risk, and as a result, your negotiation objective is based on a fixed-price incentive firm (FPIF) contract.

In the FPIF, the Government is assuming a greater share of the cost risk. You should consider this fact in developing your negotiation objectives. The target price should be based on the “most likely” price, NOT what the price might be if all the risk possibilities actually occur. Risk should be considered through the use of appropriate share ratios and a reasonable ceiling price.

CONTRACT TYPES AND FEATURES

The following chart shows the principal contract types and their features

CONTRACT TYPES AND FEATURES CHART

	FIRM FIXED PRICE (FFP)	INDEFINITE DELIVERY (ID)	FIXED PRICE ECON. PRICE ADJUSTMENT (FPEPA)	FIXED PRICE AWARD FEE (FPAF)	FP PROSPECTIVE REDETERMINABLE (FPPRD)
PRINCIPAL RISK TO BE MITIGATED	None. Costs of performance can be estimated with a high degree of confidence. Thus, the contractor assumes the Risk	At the time of award, delivery requirements are NOT certain. Use: • Definite Quantity (If the required quantity is known and funded at the time of award).	Market prices for required labor and/or materials are likely to be highly unstable over the life of the contract	Acceptance criteria are inherently judgmental, with a corresponding risk that the user will NOT be fully satisfied.	Costs of performance can be estimated with confidence only for the first year of performance.
USE WHEN..	<ul style="list-style-type: none"> The requirement is well-defined. Contractors are experienced in meeting it. Market conditions are stable. Financial risks are otherwise insignificant. 	<ul style="list-style-type: none"> Indefinite Quantity (if the minimum quantity required is known and funded at award). Requirements (if no commitment on quantity is possible at award). 	The market prices at risk are severable and significant. The risk stems from industry wide contingencies beyond the contractor's control. The dollars at risk outweigh the administrative burdens of an FPEPA.	Judgmental standards can be fairly applied by an Award Fee panel. The potential fee is large enough to both: <ul style="list-style-type: none"> Provide a meaningful incentive. Justify administrative burdens of an FPAF. 	The Government needs a firm commitment from the contractor to deliver the supplies or services during subsequent years. The dollars at risk outweigh the administrative burdens of an FPPRD.
ELEMENTS	A firm fixed price for each line item or one or more groupings of line items.	<ul style="list-style-type: none"> "Per unit" price. Performance period. Ordering activities and delivery points. Maximum or minimum limit (if any) on each order. Extent of each party's commitment on quantity. 	A fixed price, ceiling on upward adjustment, and a formula for adjusting the price up or down based on: <ul style="list-style-type: none"> established prices. actual costs of the labor materials. labor or material indices. 	<ul style="list-style-type: none"> A firm fixed price. Standards for evaluating performance. Procedures for calculating a "fee" based on performance against the standards¹ 	<ul style="list-style-type: none"> Fixed price for the first period. Proposed subsequent periods (at least 12 months apart). Timetable for pricing the next period(s).
CONTRACTOR IS OBLIGED TO:	Provide an acceptable deliverable at the time, place and price specified in the contract.	Provide an acceptable deliverable at the time and place specified in each order at the per unit price, within any ordering limits established by the contract.	Provide an acceptable deliverable at the time and place specified in the contract at the adjusted price.	Perform at the time, place, and the price fixed in the contract.	Provide acceptable deliverables at the time and place specified in the contract at the price established for each period.
CONTRACTOR INCENTIVE (OTHER THAN MAXIMIZING GOODWILL)²	Generally realizes an additional dollar profit for every dollar that costs are reduced.	Generally realizes an additional dollar profit for every dollar that per unit costs are reduced.	Generally realizes an additional dollar for every dollar that costs are reduced.	Generally realizes an additional dollar of profit for every dollar that costs are reduced; plus an additional fee for satisfying the performance standards.	For the period of performance, realizes an additional dollar of profit for every dollar that costs are reduced.
TYPICAL APPLICATION	Commercial supplies and services.	Long-term contracts for commercial supplies and support services.	Long-term contracts for commercial supplies during a period of high inflation	Installation support services.	Long-term production of spare parts for a major system.
PRINCIPAL LIMITATIONS IN FAR PARTS 16, 32, 35, AND 52	Generally NOT appropriate for R&D.	Per unit price may only be FFP, FPEPA, FPPRD, or catalog/market based. Under a Req. contract, must procure only from that contractor for the covered deliverables.	MUST be justified.	MUST be negotiated.	MUST be negotiated. Contractor must have an adequate accounting system that supports the pricing periods. Prompt redeterminations.
VARIANTS	Firm Fixed Price Level of Effort.				Retroactive Redetermination

¹ The amount of the award fee is not subject to the Dispute Clause.

² Goodwill being the value of the name, reputation, location, and other intangible assets of a firm.

CONTRACT TYPES AND FEATURES CHART

FIXED PRICE INCENTIVE (FPI)	COST PLUS FIXED FEE (CPFF)	COST PLUS INCENTIVE FEE (CPIF)	COST PLUS AWARD FEE (CPAF)	COST OR COST SHARING (C/CS)	TIME AND MATERIALS (T&M)
Labor or material requirements for the work are moderately uncertain. Hence, the Government assumes part of the risk.	Labor hours, labor mix, and/or material requirements (and other things) necessary to perform are highly uncertain and speculative. Hence, the Government assumes the risks inherent in the contract — benefiting if the actual cost is lower than the expected cost; losing if the work cannot be completed within the expected cost of performance. Some cost type contracts include procedures for raising or lowering the fee as an incentive for the contractor to perform at lower cost and/or attain performance goals.				
A ceiling price can be established that covers the most probable risks inherent in the nature of the work. The proposed profit sharing formula would motivate the contractor to control costs to and meet other objectives.	Relating fee to performance (e.g., to actual costs) would be unworkable or of marginal utility.	An objective relationship can be established between the fee and such measures of performance as actual costs, delivery dates, performance benchmarks, and the like.	Objective incentive targets are not feasible for critical aspects of performance. Judgmental standards can be fairly applied. ¹ Potential fee would provide a meaningful incentive.	<ul style="list-style-type: none"> The contractor expects substantial compensating benefits for absorbing part of the costs and/or foregoing fee or The vendor is a non-profit entity 	Use only when no other contract type is suitable. — e.g., when costs are too low to warrant auditing a contractor's indirect expenses as required per a CPFF contract. The CO must prepare a D&F justifying use of this contract type.
<ul style="list-style-type: none"> A ceiling price Target cost Target Profit Delivery, quality, and/or other performance targets (optional) Profit sharing formula 	<ul style="list-style-type: none"> Target cost a fixed fee 	<ul style="list-style-type: none"> Target cost Performance targets (optional) A minimum, maximum, and target fee A formula for adjusting fee based on actual costs and/or performance 	<ul style="list-style-type: none"> Target Standards for evaluating performance A base and maximum fee Procedures for adjusting "fee", based on performance against the standards 	<ul style="list-style-type: none"> Target cost If CS, an agreement on the Government's share of the cost. No fee 	<ul style="list-style-type: none"> A ceiling price A per-hour labor rate that also covers overhead and profit Provisions for reimbursing direct material costs
Provide an acceptable deliverable at the time and place specified in the contract at or below the ceiling price.	Make a good faith effort to meet the Government's needs within the estimated cost in the Schedule.				Make a good faith effort to meet the Government's needs within the "ceiling price."
Realizes a higher profit by completing the work below the ceiling price and/or by meeting objective performance targets.	Realizes a higher rate of return (i.e., fee divided by total cost) as total cost decreases.	Realizes a higher fee by completing the work at a lower cost and/or by meeting other objective performance targets.	Realizes a higher fee by meeting judgmental performance standards.	If CS, shares in the cost of providing a deliverable of mutual benefit	
Production of a major system based on a prototype	Research study	Research and development of the prototype for a major system.	Large scale research study.	Joint research with educational institutions.	Emergency repairs to heating plants and aircraft engines.
Must be justified. Must be negotiated. Contractor must have an adequate accounting system. Targets MUST be supported by the cost data.	The contractor must have an adequate accounting system. The Government must exercise surveillance during performance to ensure use of efficient methods and cost controls. Must be negotiated. Must be justified. Statutory and regulatory limits on the fees that may be negotiated. Must include the applicable "Limitation of Cost" clause at FAR 52.232-20 through 23.				MUST be justified.. Labor rates must be negotiated. The Government MUST exercise appropriate surveillance to ensure efficient performance.
Firm or Successive Targets	Completion or Term.				Labor Hour (no material costs)

End-of-Chapter Vignette

Andrew needs help, again.

- 1. WEC is projecting manufacturing labor and wages based on history. Describe what WEC is assuming about manufacturing cost behavior.*

- 2. WEC is claiming liaison engineering is best represented as a percentage of manufacturing labor. Describe what WEC is assuming about engineering cost behavior.*

- 3. Does WEC use of history recognize should-cost? Explain.*

- 4. A factor to consider under cost risk is contract type. The proposal assumes what contract type? Is this contract type appropriate?*

Chapter Vignette

Tools of The Trade

“A major part of analyzing proposals is identifying and using appropriate estimating techniques,” Kay told Andrew. “I’m just about ready to put you to work on that radio proposal, but you really need a review on estimating techniques before you can do an effective analysis. After you are comfortable with the mechanics of the techniques, come see me and we will get started!”

Andrew finally feels like he will get to do something interesting. He figures the sooner he gets started on a good working knowledge of the “number crunching” the sooner he can REALLY get to work!

Course Learning Objectives

At the end of this chapter, you will be able to use the following techniques to estimate costs:

- Sampling
- Index numbers
- Cost-volume-profit analysis
- Line-of-best-fit projections
- Cost estimating relationships
- Economic trend analysis (moving averages)
- Improvement curves

Chapter Overview

Introduction

In cost analysis, you are developing negotiation positions concerning the allowability of the costs proposed by the offeror. To develop negotiation positions, you must understand the rules for proposal preparation and cost allowability described in previous chapters. You must also be able to use the basic quantitative techniques used in cost estimation and analysis. To do this, you must be able to:

- Determine if the offeror used appropriate techniques in estimate development.
- Determine if the offeror properly applied the techniques used in estimate development.
- Understand how other government analysts used a particular technique to confirm or refute offeror estimates.
- Develop your own independent estimate using one or more quantitative techniques.

This chapter introduces many of the major techniques used in cost estimating and analysis. However, there are other techniques that may be of value in analysis, such as scatter diagrams and formal regression analysis. Good sources of information on these and other techniques are Appendices E and F of the Defense Contract Audit Agency (DCAA) Audit Manual.

The overall objective of this chapter is for the student to understand the application of each technique presented. Later chapters will provide guidance on analyzing an offeror's use of these techniques in estimating specific cost elements.

Symbols Used in this Chapter



In this chapter:

* is used as the multiplication symbol.

X is used in equations as a variable.

÷ is used as the division symbol.

(continued on next page)

Chapter Overview

(continued)

Maps in This Chapter

This chapter contains the following maps:

6.1 SAMPLING	6-5
6.2 INDEX NUMBERS	6-10
6.2.1 Price Index Numbers	6-11
6.2.2 Government and Commercial Indexes	6-14
6.2.3 Adjusting Price for Inflation/Deflation	6-17
6.3 COST-VOLUME-PROFIT ANALYSIS	6-25
6.3.1 Cost-Volume-Profit Analysis	6-26
6.3.2 Linear Cost-Volume Relationship	6-28
6.3.3 Cost-Volume-Profit Relationship	6-36
6.4 FITTING A LINE-OF-BEST-FIT	6-40
6.4.1 Fitting a Line-of-Best-Fit	6-41
6.4.2 Visually Fitting a Line	6-42
6.4.3 Least-Squares-Best-Fit Line Fitting	6-48
6.5 ECONOMIC FORECASTS	6-50
6.5.1 Sources of Economic Forecasts	6-51
6.5.2 Preparing Economic Forecasts	6-52
6.6 COST ESTIMATING RELATIONSHIPS	6-55
6.6.1 Cost Estimating Relationships	6-56
6.6.2 Developing a Cost Estimating Relationship	6-58
6.7 MOVING AVERAGES	6-67
6.7.1 Uses of Moving Averages	6-68
6.7.2 Developing a Simple Moving Average	6-69
6.7.3 Other Types of Moving Averages	6-72
6.8 IMPROVEMENT CURVE ANALYSIS	6-74
6.8.1 Improvement Curve Analysis	6-75
6.8.2 Basic Improvement Curve Theories	6-79
6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory	6-82
6.8.4 Interpret Improvement Curves Using Lot Data	6-90
6.8.5 Fitting and Projecting an Improvement Curve	6-94

6.1 SAMPLING

Overview	Cost elements, such as direct material costs, may be comprised of hundreds or thousands of separately priced items. Evaluating the reasonableness of the cost estimate for each and every item would require more manpower and time than the government can reasonably make available. By selecting and analyzing a random sample of such items, you can develop a credible position on the total cost of all items.
----------	--

Random Sampling	Random sampling means that every item must have an equal chance of being selected for analysis. Only if the selection is random can statistical confidence in the sample results be determined.
-----------------	---

Stratified Sampling	Stratified sampling, as used in this course, means dividing items of cost into groups, called strata (stratum in the singular), and separately developing a prenegotiation position for each stratum based on a random sample of items in the stratum. This allows you to concentrate your efforts on the items with the greatest potential for cost reduction while random sampling the smaller value items to assure that there is no general pattern of overpricing.
---------------------	---

The most common use of sampling occurs in the analysis of detailed material cost proposals. Often hundreds, even thousands, of material items are purchased to support production of items and systems to meet Government requirements. To analyze the quantity requirements and units prices for each item would be extremely time consuming and expensive. Because often more than 50 percent of the contract price is in material items, effective review is essential. The overall environment is custom made for the use of stratified sampling.

The table on the next page lists the steps in stratified sampling.

E-Z-Quant	You can order software, such as the program “E-Z-Quant” of the Defense Contract Audit Agency, to automate many of the steps in sampling and also generate additional data, such as “confidence intervals” for the decrement and the range of dollar amounts (expressed as upper and lower dollar limits) defined by the confidence interval.
-----------	--

(continued on next page)

6.1 SAMPLING

(continued)

Steps in Stratified Sampling

STEP	ACTION
1	<p>In the first stratum, place items that merit "100% analysis".</p> <p>Give special consideration to:</p> <ul style="list-style-type: none"> • "Big ticket items" — items that comprise a substantial portion of the total estimated cost of the contract. You can evaluate the allowability of a substantial portion of proposed cost by analyzing relatively few items. • Costs of an unusual or sensitive nature. • Costs in areas where offeror procedures or internal controls are known to be weak or where deficiencies have been disclosed in previous analyses. • Costs in areas not subject to previous reviews. • Costs in areas where incorrect estimates will have a substantial overall effect on cost. For example, a cost may not be a substantial portion of total contract costs but when overheads are applied the total cost effect may be substantial. <p>Analyze and develop a separate prenegotiation position on every item in this stratum. Total those positions to arrive at an overall prenegotiation position for this stratum.</p>
2	<p>Group the remaining items into separate strata.</p> <p>If there are relatively few (e.g., 50) items, you might lump them all in a single stratum. If there are thousands of items, you might group them by such criteria as dollar value. For example, you might create one stratum for all items with unit prices of \$5,001 to \$20,000. You might create another stratum for all items with unit prices of \$5,000 or less.</p>
3	<p>Determine the number of items to sample in each stratum.</p> <p>How many items are you going to sample? Several factors affect sample size. The primary ones are variability, desired confidence, and the total count of items in the stratum. Use statistical tables or computer programs to determine the proper sample size for each stratum.</p>

6.1 SAMPLING

(continued)

Steps in
Stratified
Sampling
(continued)

STEP	ACTION
4	<p>Randomly select items for analysis.</p> <p>Assign each item a sequential number. Use a table of random numbers or a computer generated random numbers to select items for the sample. Do not select the same item twice.</p>
5	<p>Develop a "decrement factor" for the stratum.</p> <ul style="list-style-type: none"> Analyze the proposed price (i.e., quantity multiplied by unit price) of each sampled item . Develop a "should pay" price for the item. <p>You must do this for every item in the sample, regardless of difficulty, to provide statistical integrity to the results. If you cannot develop a position on a sampled item because offeror data for the item is plagued by excessive misrepresentations or errors, you might have to discontinue your analysis and return the proposal to the offeror for correction and update.</p> <ul style="list-style-type: none"> Determine the average percentage by which should pay prices for the sampled items differ from proposed prices. This percentage is the decrement factor.¹ Consult a statistician to calculate various measures of dispersion, such as standard deviation, and confidence intervals for the decrement factor.
6	<p>Apply the decrement factor to the total proposed cost of all items in the stratum. The resulting dollar figure is your prenegotiation position for the stratum.</p>
7	<p>Total prenegotiation positions for all strata to establish your overall position on the cost category.</p>

¹There are a number of techniques for determining the "average" percentage which will produce different results. For example, you could (1) determine the percentage by which each should pay price differs from each proposed price, (2) sum the percentages, and (3) divide by the total number of items in the sample. This technique gives equal weight to all sampled items in establishing the decrement factor. Or you could (1) total proposed prices for all sampled items, (2) total the dollar differences between should pay and proposed prices, and (3) divide the latter total by the former total. This technique gives more weight to the higher priced sampled items in establishing the decrement factor. Regression-through-the-origin analysis provides still a third way of determining the decrement factor. In the example on the next page, we will have used the second technique.

6.1 Sampling

(continued)

Example

Assume you are responsible for analyzing a cost proposal with 100 line items. The offeror has proposed a total cost of \$5,000,000 for the line items. Every line item, however, is separately priced.

Step 1: In the first stratum, place items that merit "100% analysis"

20 of the items account for 80% of the total cost of the line items. You decide to analyze each of these in turn. Your prenegotiation position for the 20 items is \$3,500,000 — \$500,000 less than the offeror's estimate.

Step 2: Group the remaining items into separate strata.

You decided to place all remaining items into a single stratum.

Step 3: Determine the number of items to sample.

After consulting various tables, you decide on a 20% sample.

Step 4: Randomly select items for analysis.

Given your decision on a sample size of 20%, you will need to randomly select 16 of the 80 items for analysis. Begin by sequentially assigning a number to each of the 80 items (i.e., #1, #2, #3, #4 ... #79, and #80).

You could select the 16 items by (1) putting 80 sheets of paper, one for each item, into a large vat, (2) mixing thoroughly, and (3) pulling 16 slips of paper from the vat. If the slips of paper were thoroughly mixed, you would have a simple random sample.

A less cumbersome method would be to use a random number table. In a random number table, the digits 0 through 9 appear in no particular pattern. Each digit has an equal probability (1/10) of occurring. The number of digits in the random number should be greater than or equal to the number of digits assigned to any item in the population.

To pull the sample of 16 items, use the first two digits from each number in the following random number table (going across, then down). Skip numbers larger than 80. Also skip repeat numbers. The result: in the next step, you will analyze items 66, 37, 13, 10, 24, 22, 36, 37, 33, 16, 26, 80, 45, 44, 57, and 41.

Continued on next page

6.1 Sampling

(continued)

EXCERPT FROM A BOOK OF RANDOM NUMBERS

66 98550	37 56022	13 79873	10 91250	24 64369
8230671	22 61081	36 51245	2403835	37 96196
33 07349	16 06742	26 51096	8733169	80 20931
45 57294	44 87241	57 09649	8443898	41 86082
4867520	4593304	7859673	4715519	8672562
5256666	7532438	4932550	3189230	5767320

Example
(continued)

Step 5: Develop a "decrement factor" for the stratum.

Analysis of Item 66:

The offeror's proposed cost for item 66: \$40,000

Your "should cost" position for item 66: \$32,000

In similar fashion, analyze the remaining 15 items. Then sum the total proposed prices for all 16 items and the total should pay prices.

Sum of the proposed prices: \$140,000

Sum of the should pay prices: - \$110,000

\$30,000

$\$30,000 \div \$140,000 \times 100 = 21.43\%$

Step 6: Apply the decrement factor to the total proposed cost of all items in the stratum.

Total proposed cost for all 80 items: \$1,000,000

Decrement @ 21.43%: - \$214,300

Your prenegotiation position for this stratum: \$785,700

Step 7: Total your prenegotiation positions for all strata to establish your overall position on the cost category.

Prenegotiation position for Stratum 1 (from Step 1): \$3,500,000

Prenegotiation position for Stratum 2 (from Step 6): 785,700

Total: \$4,285,700

6.2 INDEX NUMBERS

Section Overview

Overview

This section covers the use of index numbers for:

- analyzing prices over time
- adjusting for inflation/deflation
- revealing trends that might be concealed by inflation/deflation

Several techniques are demonstrated for developing price index numbers and adjustment for inflation/ deflation. Government and commercial indexes are identified for use when insufficient data are available for developing one's own index.

Maps in This Section

In this section are the following maps:

- Price Index Numbers
 - Government and Commercial Indexes
 - Adjusting Price for Inflation/Deflation
-

6.2.1 Price Index Numbers

Introduction	<p>Price index numbers are ratios, usually expressed as percentages, indicating changes in values, quantities, or prices. Price index numbers measure changes in prices over time.</p>
Uses of Price Index Numbers	<p>You can use price index numbers to:</p> <ul style="list-style-type: none"> • <i>Inflate or deflate prices for direct comparison</i> <p>Price index numbers can be used to compare the proposed product cost and the cost of the same or a similar product purchased in the past. Comparisons can be made in constant-year dollars—dollars free of changes related to inflation/deflation.</p> <ul style="list-style-type: none"> • <i>Inflate/deflate costs to facilitate trend analysis</i> <p>Index numbers are also used to facilitate trend or time series analysis of individual cost elements by eliminating or reducing the effects of inflation so that the analysis can be made in constant-year dollars.</p> <ul style="list-style-type: none"> • <i>Estimate project price or cost over the period of contract performance</i> <p>Prices and costs of future performance are not certain. One effect that must be considered is the changing value of the dollar. Index numbers can be used to estimate and negotiate future costs and prices.</p> <ul style="list-style-type: none"> • <i>Adjust contract price or cost for inflation/deflation</i> <p>When price changes are particularly volatile, it may be necessary to include an economic price adjustment clause in the contract. These clauses typically use index numbers to measure changes in price levels.</p>

(continued on next page)

6.2.1 Price Index Numbers

(continued)

Simple and Aggregate Price Index Numbers

Price index numbers can indicate price changes for one, or several related, items or services over a period of time.

- ***Simple index numbers calculate price changes for a single item over time***

Index numbers are more accurate if they are constructed for a single commodity, product, or service rather than using a more general aggregated index.

- ***Aggregate index numbers calculate price changes for a group of related items over time***

Aggregated indexes permit analysis of price changes for the group of related products, such as price changes for apples, oranges, plywood, or nails. An example of an aggregate price index is the *Producer Price Indexes* (Bureau of Labor Statistics) that gives the changes in the average wholesale price of products sold in the United States over a given period of time.

Steps to Price Index Development

The following are steps in developing a simple index. To develop an aggregate index, follow the same steps using data on several products, weighting each product based on its relative importance to the total.

STEP	ACTION
1	Collect data
2	Select an appropriate base period
3	Divide the price for each period by the base period price
4	Multiply by 100 to produce the index for each period

**Example:
Price Index
Development****1. Collect data.**

For each index period, collect average price data for the product, commodity, or service. For example, assume the following average yearly prices for a hoist:

YEAR	1987	1988	1989	1990	1991
PRICE	\$84.12	\$90.84	\$95.06	\$101.97	\$107.32

(continued on next page)

6.2.1 Price Index Numbers

(continued)

2. *Select an appropriate base period.*

Select a base period appropriate for the data available. In this case, we will use the 1987 price, \$84.12.

3. *Divide the price for each period by the base period price.*

YEAR	AVERAGE PRICE	DIVIDED BY BASE 1987 PRICE	
1987	\$84.12	÷ \$84.12	= 1.000
1988	\$90.84	÷ \$84.12	= 1.080
1989	\$95.06	÷ \$84.12	= 1.130
1990	\$101.97	÷ \$84.12	= 1.212
1991	\$107.32	÷ \$84.12	= 1.276

4. *Multiply by 100 to produce the index number.*

Normally, we round index numbers to the nearest tenth of a percent. Using the table, we can see how the hoist price has changed relative to the 1987 price.

YEAR	YEARLY AVERAGE PRICE	DIVIDED BY BASE 1987 PRICE		* 100 =	INDEX NUMBER
1987	\$84.12	÷ \$84.12	= 1.000	* 100	= 100.0
1988	\$90.84	÷ \$84.12	= 1.080	* 100	= 108.0
1989	\$95.06	÷ \$84.12	= 1.130	* 100	= 113.0
1990	\$101.97	÷ \$84.12	= 1.212	* 100	= 121.2
1991	\$107.32	÷ \$84.12	= 1.276	* 100	= 127.6

6.2.2 Government and Commercial Indexes

Introduction

Often you will not have enough data or time to construct needed index numbers. Many sources exist for previously constructed price index numbers that are general in scope but may be used to approximate price changes of a particular product or service.

Published indexes must be used carefully since a published index usually will not exactly fit the cost pattern of the product or service being analyzed. The data are not from a specific contractor or location. Instead, data usually represent national or regional averages. Nevertheless, preconstructed index numbers offer a practical alternative to the costly and time-consuming task of developing index numbers from basic cost data.

When you use published indexes, choose the index series that best fits your specific analysis effort. Usually, the closer the index series you choose relates to the item that you are pricing, the more useful the number will be in analysis.

Sources of Government Price Indexes

The government collects and publishes vast amounts of data on prices and labor rates. Three of the best known sources of index numbers are published by the Bureau of Labor Statistics (BLS):

1. Producer Price Indexes
2. Consumer Price Index Detailed Report
3. Monthly Labor Review

Agencies and individual contracting offices may also develop and publish specific indexes.

(continued on next page)

6.2.2 Government and Commercial Indexes

(continued)

Sources of
Government
Price Indexes
(continued)

Producer Price Indexes. Probably the best known and most frequently used source of price index numbers for material pricing is the *Producer Price Indexes (PPI)* published monthly by the US Department of Labor Statistics (BLS). The PPI is divided into 15 major commodity groups. Each commodity group is broken into subgroups and individual items. Each grouping is successively arranged in homogeneous categories of products to form a general aggregation of wholesale prices for all US production.

PRODUCER PRICE INDEXES COMMODITY GROUPINGS	
COMMODITY CODE	COMMODITY DESCRIPTION
01	Farm Products
02	Processed Foods and Feeds
03	Textile Products and Apparel
04	Hides, Skins, Leather, and Related Products
05	Fuels and Related Products and Power
06	Chemicals and Allied Products
07	Rubber and Plastic Products
08	Lumber and Wood Products
09	Pulp, Paper, and Allied Products
10	Metals and Metal Products
11	Machinery and Equipment
12	Furniture and Household Durables
13	Nonmetallic Mineral Products
14	Transportation Equipment
15	Miscellaneous Products

Consumer Price Index Detailed Report. The consumer price index (CPI), published monthly in the *Consumer Price Index Detailed Report*, is based on prices from a fixed mix of goods selected from the following categories: food, clothing, shelter and fuels, transportation, and medical services. This index should not be used for material pricing unless consumer products are being purchased. However, the index can be important in pricing wage rates because many labor agreements adjust wage rates based on changes in the CPI.

(continued on next page)

6.2.2 Government and Commercial Indexes

(continued)

Sources of
Government
Price Indexes
(continued)

Monthly Labor Review. The *Monthly Labor Review* includes selected data from a number of government indexes including: an employment cost index, consumer price index data, producer price indexes data, export price indexes data, and import price indexes data. The *Monthly Labor Review* also includes additional information that can prove useful in considering analysis of proposed labor rates.

Contracting Agency Indexes. Many government agencies and some contracting offices have teams of analysts that develop unique indexes that are particularly applicable to specific contracting situations. These indexes may be developed from raw cost or price data or they may be developed as weighted averages of published indexes.

Sources of
Commercial
Price Indexes

Numerous commercial indexes are available for use in contract cost and price analysis. These indexes may be published by purchasing professional organizations, industry groups, or economic forecasting firms. Most government indexes only report historical price changes. Many commercial indexes also forecast future price movement. In situations where forecasts are necessary, commercial indexes may prove particularly useful. Before using such indexes, examine their development and consult with auditors, technical personnel, and other contracting professionals to assure that they are applicable in your analysis situation.

6.2.3 Adjusting Price for Inflation/Deflation

Introduction

Index numbers indicate the percentage change in price with respect to the base year. For example, the 1991 index of 127.6, constructed in the table above, indicates that the average price of the hoist went up 27.6 percent based on the average price in 1987.

Calculating Price Change Between Two Periods

To adjust prices for inflation/deflation, we must be able to determine how prices changed between any two periods. For example, how did the price change between 1990 and 1991 in the table on page 6-13? The method of calculating percentage change using index numbers is basically the same as the method we would use with actual price data.

Actual Price Data. Using the actual prices, \$107.35 for 1991 and \$101.97 for 1990, we can see that the 1991 price is 105.3 percent of the price in 1990:

$$\frac{\text{Price in 1991}}{\text{Price in 1990}} = \frac{\$107.35}{\$101.97} = 1.053$$

Multiply 1.053 by 100 to convert to a percentage = 105.3

Index Numbers. The same answer can be calculated through the use of the index numbers developed in the table above, 127.6 for 1991 and 121.2 for 1990:

$$\frac{\text{Index in 1991}}{\text{Index in 1990}} = \frac{127.6}{121.2} = 1.053$$

Multiply 1.053 by 100 to convert to a percentage = 105.3

Note: Answers may vary slightly because of rounding error in the various calculations.

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Estimating
Price Using
Index Numbers

If you do not know the price of an item in 1991, you can use the price in 1990, the index in 1990, and the index in 1991 to estimate the 1991 price. For this purpose, you can use either:

- Price Adjustment Formula
 - Simple Ratio
-

Price
Adjustment
Formula

Formula:

$$\frac{\text{Index for Period } T_2}{\text{Index for Period } T_1} * \text{Known Price from Period } T_1 = \text{Price Estimate for Period } T_2$$

In this formula, T_1 (Time 1) represents the period for which you have an actual price. T_2 (Time 2) represents the period for which you are trying to estimate a price. Generally, a period equates to either a given month or a given year (depending on the index). Thus, the “Price Estimate for Period T_2 ” is the adjusted historical price.

Example:

$$\begin{array}{rclcl} \frac{1991 \text{ Price Index}}{1990 \text{ Price Index}} & * & 1990 \text{ Price} & = & 1991 \text{ Price Estimate} \\ \frac{127.6}{121.2} & * & \$101.97 & = & \$107.35 \end{array}$$

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Ratio Method

$$\frac{\text{Index for Period } T_2}{\text{Index for Period } T_1} = \frac{\text{Price Estimate for Period } T_2}{\text{Known Price from Period } T_1}$$

$$\frac{127.6}{121.2} = \frac{1991 \text{ Price Estimate}}{\$101.97}$$

$$\$101.97 * 127.6 = 121.2 * 1991 \text{ Price Estimate}$$

$$\$13,011.37 = 121.2 * 1991 \text{ Price Estimate}$$

$$\$13,011.37 \div 121.2 = 1991 \text{ Price Estimate}$$

$$\$107.35 = 1991 \text{ Price Estimate}$$

Estimating Price
in Determining
Reasonableness

Index numbers can be used to inflate or deflate prices to allow for general price level changes in determining if cost/price is reasonable. Analysis follows four general steps:

STEP	ACTION
1	Collect available price data
2	Select an index series
3	Adjust price for inflation
4	Compare projected and proposed prices

Consider the problem of analyzing a contractor's proposed price of \$22,500 for a turret lathe to be delivered in 1991.

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Example:
Estimating
Price Using
Index
Numbers

Step 1. Collect Available Data. A procurement history file reveals that the same machine tool was purchased in 1988 at a price of \$18,500. The task is to determine if the 1991 proposed price is reasonable.

Step 2. Select an Index Series. To determine if cost/price is reasonable, we would first select or construct an appropriate index series. A Machinery and Equipment Index might be selected as a reasonable indicator of price movement for a turret lathe. We could extract the data from a publication, such as the PPI or a similar commercial index.

YEAR	MACHINERY & EQUIPMENT INDEX
1986	100.0
1987	103.2
1988	106.5
1989	111.4
1990	115.5
1991	120.0

Step 3. Adjust for Inflation. After we have selected an index, we can adjust prices to a common dollar value level. In this case, you would normally adjust the historical 1988 price (T_1) to the 1991 dollar value level (T_2). We could adjust the current price to the 1988 dollar value level or adjust all prices to base-year (1986) dollars, but adjusting to current prices makes price differences more meaningful in analysis and negotiations. To make the adjustment, we simply use one of the methods already demonstrated.

$$\begin{array}{rclcl}
 \frac{\text{Index for Period } T_2}{\text{Index for Period } T_1} & * & \text{Known Price from Period } T_1 & = & \text{Price Estimate for Period } T_2 \\
 \\
 \frac{1991 \text{ Price Index}}{1988 \text{ Price Index}} & * & 1988 \text{ Price Estimate} & = & 1991 \text{ Price} \\
 \\
 \frac{120.0}{106.5} & * & \$18,500 & = & \$20,845
 \end{array}$$

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Example:
Estimating
Price Using
Index
Numbers
(continued)

Step 4. Compare Projected and Proposed Prices. Once the adjustment for inflation is made, we can compare the quoted and historical prices in comparable dollar values. The quoted price is \$22,500, but the adjusted historical price is only \$20,845. The quoted price is \$1,655—7.9 percent—higher than what we would expect it to be, based on the available indexes and the historical price.

If we look at the percentage price change since the last purchase, the difference is even more pronounced. Analysis projects an increase from \$18,500 to \$20,845 or about 12.7 percent. The actual increase was from \$18,500 to \$22,500 or about 21.6 percent. The increase is about 70 percent more than what we expected.

This analysis alone cannot determine if the quoted cost/price is reasonable. The entire contracting situation must be considered. Differences in quantity, quality, delivery requirements, or other contract terms can significantly affect price. However, our analysis using historical prices and index numbers does raise concern about the reasonableness of the quoted cost/price.

Adjustment
for Further
Analysis

Often a series of purchases are made over a period of time. Pricing trends may develop that are obscured by inflation/deflation. Adjusting prices for inflation/deflation will make it possible to analyze these trends.

Adjustment for trend analysis follows four steps similar to those used for data adjustment that are applied in preparation for direct comparison. The major difference is that several elements of cost/price data must be adjusted to a single time period. After adjustment, data is said to be in constant-year dollars.

STEP	ACTION
1	Collect available price data
2	Select an index series
3	Adjust price for inflation
4	Apply appropriate analysis technique

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Example:
Adjustment for
Further Analysis

To illustrate this analysis, consider an offer of \$22,500 each for five precision presses in 1991.

Step 1. Collect Available Data. The organization has purchased five similar presses each year since 1986. The historical unit prices are shown in Column 4 of the table below. While purchase quantity changes are not present in this situation, unit prices are used to limit the effect of quantity differences on trend analysis. In this case, the only apparent cost/price trend in the unadjusted data is increasing prices.

Step 2. Select and Index Series. Again, the Machinery and Equipment Index will be used. Annual indexes are presented in Column 2 of the table below.

Step 3. Adjust for Inflation. The adjustment calculation is presented in Column 3 of the table below. Each historical price is adjusted to equivalent prices in 1991 dollars.

YEAR	MACHINERY & EQUIPMENT INDEX	INDEX NUMBERS ADJUSTMENT CALCULATION	HISTORICAL PRICES	ADJUSTED PRICES
1986	100.0	$\frac{120.0}{100.0}$	\$17,666.67	\$21,200
1987	103.2	$\frac{120.0}{103.3}$	\$18,077.50	\$21,000
1988	106.5	$\frac{120.0}{106.5}$	\$18,460.00	\$20,800
1989	111.4	$\frac{120.0}{111.4}$	\$19,123.67	\$20,600
1990	115.5	$\frac{120.0}{115.5}$	\$19,635.00	\$20,400
1991	120.0			

(example continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Example:
Adjustment
for Further
Analysis
(continued)

Step 4. Apply Appropriate Analysis Technique. After the historical unit prices are adjusted to 1991 dollars, a trend becomes obvious. In 1991 dollars, prices have been dropping \$200 each year since 1986. The obvious price estimate is \$20,200 for the 1991 purchase. That projection is based on the continuation of the historical trend. However, as with direct comparison, analysis based on historical prices must consider any changes in the contracting situation and their possible affect on contract price. There may also be questions as to what has caused the trend and whether those forces will continue to cause price changes.

Most trends are not so obvious, even after prices have been adjusted to constant-year dollars. Still, techniques such as cost estimating relationships and improvement curve analysis can often be applied to adjusted data to identify clear trends in adjusted data.

Selecting
Appropriate
Adjustment
Period

When adjusting historical prices for inflation, care must be taken in selecting the period of adjustment. There are two basic methods that are used in adjusting costs/prices:

1. Purchase Period to Purchase Period
2. Delivery Period to Delivery Period.

Purchase Period to Purchase Period. This is the method most commonly used to calculate the period of price adjustment, because purchase dates are readily available.

An item is being purchased in January 1992 was last purchased in January 1991. The logical adjustment period is January 1991 to January 1992. If delivery schedules are similar, this period should be satisfactory. If delivery schedules are significantly different, you may be over or under estimating the adjustment required.

Example: If the first purchase provided for delivery in June 1991 and the second purchase provides for delivery in January 1992, you may be over estimating the adjustment required. Presumably, the first purchase price considered price changes through June 1991.

If the first purchase provided for delivery in January 1991 and the second in June 1992, you may be underestimating the adjustment required.

(continued on next page)

6.2.3 Adjusting Price for Inflation/Deflation

(continued)

Selecting
Appropriate
Adjustment
Period
(continued)

Delivery Period to Delivery Period. This method for determining the appropriate period of adjustment is probably more accurate for the reasons described above. The problem with applying this method is the collection of accurate information on delivery dates. Application is further complicated by deliveries over an extended period of time.

For smaller dollar material purchases in periods of limited price changes, the differences between purchase period to purchase period and delivery period to delivery period adjustment may not be that significant. However, as contract prices increase or price changes become more volatile, selection of the proper adjustment period becomes more important.

Wage rates should always be estimated for the time period in which the work is being performed.

If the offeror used indices to normalize prices across time, ensure that the offeror normalized prices from purchase date to purchase date — NOT from purchase date to delivery date.

6.3 COST-VOLUME-PROFIT ANALYSIS

Section Overview

Overview	<p>This section explains and illustrates mathematical techniques for linear cost-volume and cost-volume-profit analysis. Fixed, variable, and semi-variable costs are defined and graphically illustrated.</p> <p>The analysis of linear cost-volume relationships is explained both algebraically, including how to calculate total cost, variable cost, and fixed cost; and graphically.</p> <p>This analysis is expanded to include profit. The equation for cost-volume-profit is developed and its use demonstrated with examples. The effect of contribution income on profitability is explained and illustrated with an example.</p>
Maps in This Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Cost-volume-Profit Analysis• Linear Cost-Volume Relationship• Cost-Volume-Profit Relationship

6.3.1 Cost-Volume-Profit Analysis

Introduction

The cost-volume-profit analysis technique can be used in estimating the appropriate price for an individual product or the entire output of a particular firm. It has application in determining what a particular product should cost as well as determining the effect of customer decisions on the profitability of the firm.

Cost-volume-profit analysis considers only operations in the short run—a period too short to permit facilities expansion or contraction and other changes that might affect overall production cost relationships.

The technique assumes use of the straight line in analysis. While the actual cost behavior may not follow a straight line, the use of the straight line can closely approximate actual cost behavior in the short run. If production volume moves outside the relevant range of available production data, the straight-line assumption and the accuracy of estimates become questionable.

Definitions

In the short run, costs exhibit three general types of behavior: fixed, variable, and semivariable.

Fixed Cost. Total fixed costs remain constant as volume varies in the relevant range of production. Fixed cost per unit decreases as the cost is spread over an increasing number of units.

Examples include: fire insurance, depreciation, facility rent, and property taxes. All these costs will remain constant in the relevant range of production.

Variable Cost. Variable cost per unit remains constant no matter how many units are made in the relevant range of production. Total variable cost increases as the number of units increases.

Examples include: production labor and production material. If no units are made, neither are necessary. However, each unit produced requires material and labor.

(continued on next page)

6.3.1 Cost-Volume-Profit Analysis

(continued)

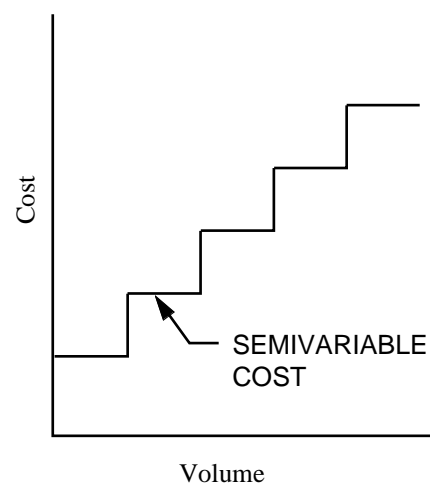
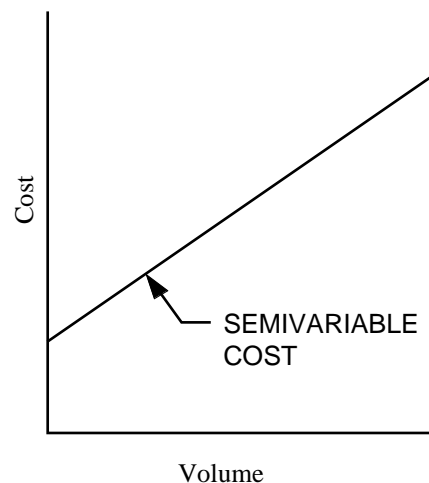
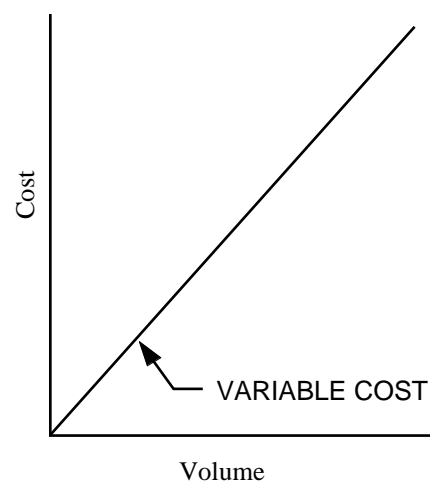
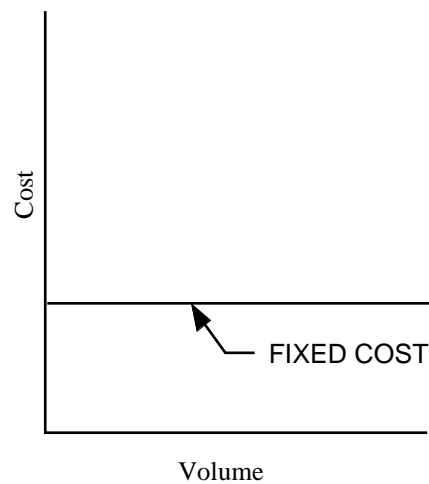
Definitions

(continued)

Semivariable Cost. Semivariable costs include both fixed and variable cost elements. Costs may increase in steps or increase relatively smoothly from a fixed base.

Examples include: supervision and utilities, such as electricity, gas, and telephone. Supervision costs tend to increase in steps as a supervisor's span of control is reached. Utilities typically have a minimum service fee and costs increase relatively smoothly as more of the utility is used.

Graphic Depiction of Cost-Volume Relationships



6.3.2 Linear Cost-Volume Relationship

Assumption	The assumption of linear cost behavior permits use of straight-line graphs and simple linear algebra in cost-volume analysis.
------------	---

Algebraic Analysis	<p>Calculating Total Cost. Total cost is a semivariable cost—some costs are fixed, some costs are variable, and others are semivariable. In analysis, the fixed component of a semivariable cost can be treated like any other fixed cost. The variable component can be treated like any other variable cost. As a result, we can say that:</p>
--------------------	---

$$\text{Total Cost} = \text{Fixed Cost} + \text{Variable Cost}$$

or using symbols:

$$\text{TC} = \text{FC} + \text{VC} \quad \text{where:} \quad \begin{array}{l} \text{TC} = \text{Total Cost} \\ \text{FC} = \text{Fixed Cost} \\ \text{VC} = \text{Variable Cost} \end{array}$$

Total variable cost depends on two elements:

1. Variable Cost per Unit
2. Volume Produced

$$\text{VC} = \text{VC}_U * \text{Vol} \quad \text{where:} \quad \begin{array}{l} \text{VC}_U = \text{Variable Cost per Unit} \\ \text{Vol} = \text{Quantity Produced} \end{array}$$

Substituting this information into the basic Total Cost Equation, we have the equation used in cost-volume analysis:

$$\text{TC} = \text{FC} + (\text{VC}_U * \text{Vol})$$

Example: If you know that Fixed Costs are \$500, Variable Cost per Unit is \$10, and the Volume produced is 1,000 units, you can calculate the Total Cost of production.

$$\text{TC} = \text{FC} + (\text{VC}_U * \text{Vol})$$

$$\text{TC} = \$500 + (\$10 * 1,000)$$

$$\text{TC} = \$500 + \$10,000$$

$$\text{TC} = \$10,500$$

(continued on next page)

6.3.2 Linear Cost-Volume Relationship

(continued)

Algebraic
Analysis
(continued)

Calculating Variable Cost. Given Total Cost, Volume for two different levels of production, and the straight-line assumption, you can calculate Variable Cost per Unit.

Remember:

1. *that Fixed Costs do NOT change no matter what the volume, as long as we are in the relevant range of production. Any change in total cost is the result of a change in total Variable Cost.*
2. *that Variable Cost per Unit does NOT change in the relevant range of production.*

As a result, we can calculate Variable Cost per unit (VC_U) by:

$$VC_U = \frac{\text{Change in Total Cost}}{\text{Change in Volume}}$$

$$VC_U = \frac{\text{Total Cost at Point 2} - \text{Total Cost at Point 1}}{\text{Volume at Point 2} - \text{Volume at Point 1}}$$

$$VC_U = \frac{TC_2 - TC_1}{Vol_2 - Vol_1}$$

Example: You are analyzing an offeror's cost proposal. As part of the proposal the offeror shows that a supplier offered 5,000 units of a key part for \$60,000. The same quote offered 4,000 units for \$50,000. What is the apparent variable cost per unit?

$$VC_U = \frac{TC_2 - TC_1}{Vol_2 - Vol_1}$$

$$VC_U = \frac{\$60000 - \$50000}{5000 - 4000}$$

$$VC_U = \frac{\$10000}{1000}$$

$$VC_U = \$10$$

(continued on next page)

6.3.2 Linear Cost-Volume Relationship

(continued)

Algebraic
Analysis

(continued)

Calculating Fixed Cost. If you know Total Cost and Variable Cost per Unit for any Quantity, you can calculate Fixed Cost using the basic Total Cost equation.

Example continued: In the previous section, we calculated Variable Cost per Unit given information on two data points. Using the Total Cost for 5,000 units, \$60,000; the calculated Variable Cost per Unit, \$10; and the Total Cost equation; we can calculate fixed cost.

$$TC = FC + (VC_U * Vol) \quad \text{where:} \quad TC = \$60,000$$

$$VC_U = \$10$$

$$Vol = 5,000$$

$$\$60,000 = FC + (\$10 * 5,000)$$

$$\$60,000 = FC + \$50,000$$

$$\$60,000 - \$50,000 = FC$$

$$\$10,000 = FC$$

Develop Estimating Equation. Now that you know that VC_U is \$10 and FC is \$10,000 you can substitute the values into the general Total Cost Equation.

$$TC = FC + (VC_U * Vol)$$

$$TC = \$10,000 + (\$10 * Vol)$$

The result is an equation that can be used to estimate the total cost of any volume in the relevant range between 4,000 and 5,000 units.

Example: Estimate the total cost of 4,400 units.

$$TC = \$10,000 + (\$10 * Vol)$$

$$TC = \$10,000 + (\$10 * 4,400)$$

$$TC = \$10,000 + \$44,000$$

$$TC = \$54,000 \text{ for } 4,400 \text{ units}$$

(continued on next page)

6.3.2 Linear Cost-Volume Relationship

(continued)

Graphic Analysis

When you only have two data points, you must generally assume a linear relationship. When you get more data, you can examine the data to determine if there is truly a linear relationship.

You should always graph the data before performing an algebraic analysis.

- Graphic analysis is the best way of developing an overall view of cost-volume relationship.
 - Graphic analysis is useful in analyzing cost-volume relationships, particularly, when the cost and volume numbers involved are relatively small.
 - Even when actual analysis is performed algebraically you can use graphs to demonstrate cost-volume analysis to others.
-

(continued on next page)

6.3.2 Linear Cost-Volume Relationship

(continued)

Graphic
Analysis
(continued)

There are four steps in using graph paper to analyze cost-volume relationships:

STEP	ACTION
1	<p>Determine the scale that will be used.</p> <p>Volume is considered the independent variable and will be graphed on the horizontal axis. Cost is considered the dependent variable and will be graphed on the vertical axis. The scales on the two axes do not have to be the same. However, on each axis one block must represent the same amount of change as every other block of the same size on that axis. Each scale should be large enough to permit analysis, and small enough to permit graphing of all available data and anticipated data estimates.</p>
2	<p>Plot the available cost-volume data.</p> <p>Find the volume given for one of the data points on the horizontal axis. Draw an imaginary vertical line from that point. Find the related cost on the vertical axis and draw an imaginary horizontal line from that point. The point where the two lines intersect represents the cost for the given volume. (If you do not feel comfortable with imaginary lines you may draw dotted lines to locate the intersection.) Repeat this step for each data point.</p>
3	<p>Fit a straight line to the data.</p> <p>In this section of text, all data points will fall on a straight line. All that you have to do to fit a straight line is connect the data points. Fitting a straight line when all points do not fall on the line will be addressed in a later section, Line of Best Fit Projections.</p>
4	<p>Estimate the cost for a given volume.</p> <p>Draw an imaginary vertical line from the given volume to the point where it intersects the straight line that you fit to the data points. Then move horizontally until you intersect the vertical axis. That point is the graphic estimate of the cost for the given volume of the item.</p>

6.3.2 Linear Cost-Volume Relationship

(continued)

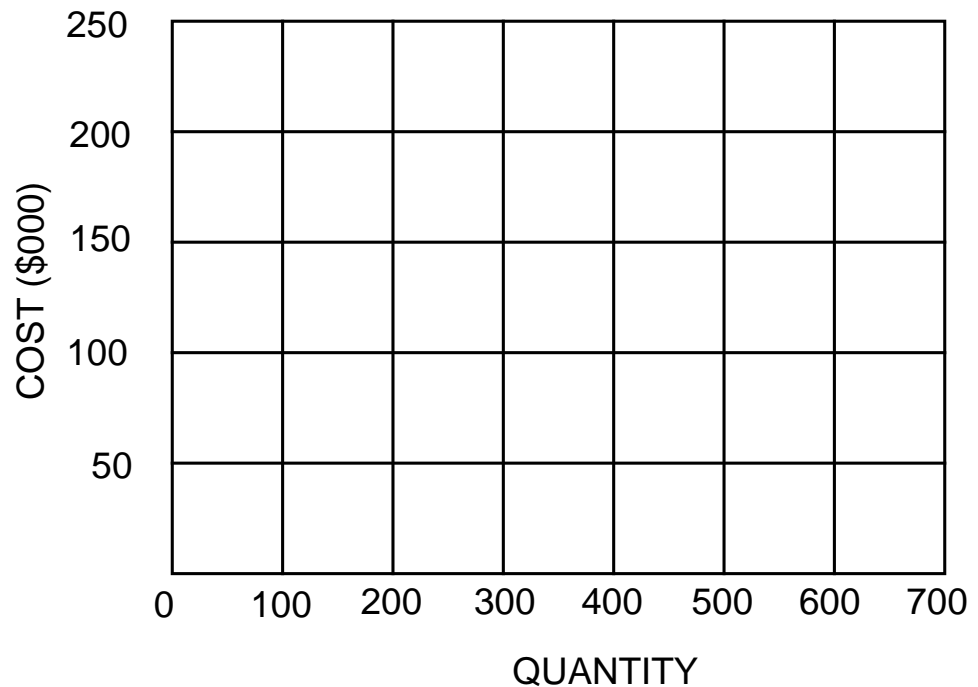
Example:
Graphic
Analysis
(continued)

These four steps can be used to graph and analyze any cost-volume relationship.

You have been asked to estimate the cost of 400 units given the following data:

UNITS	COST
200	\$100,000
500	\$175,000
600	\$200,000

Step 1. Determine the scale that will be used.



(continued on next page)

6.3.2 Linear Cost-Volume Relationship

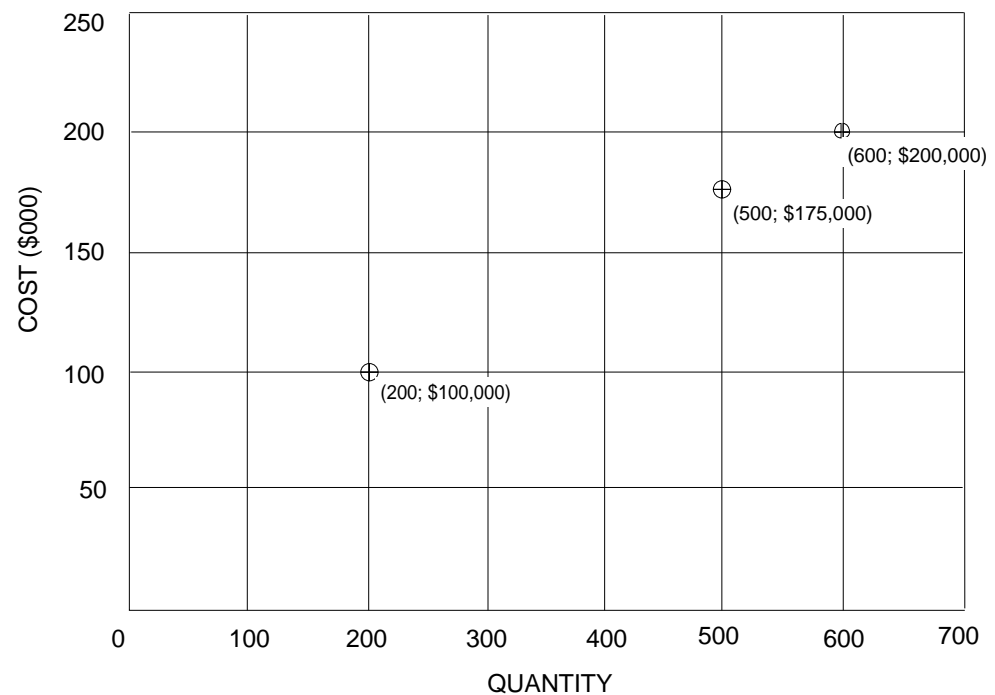
(continued)

Example:

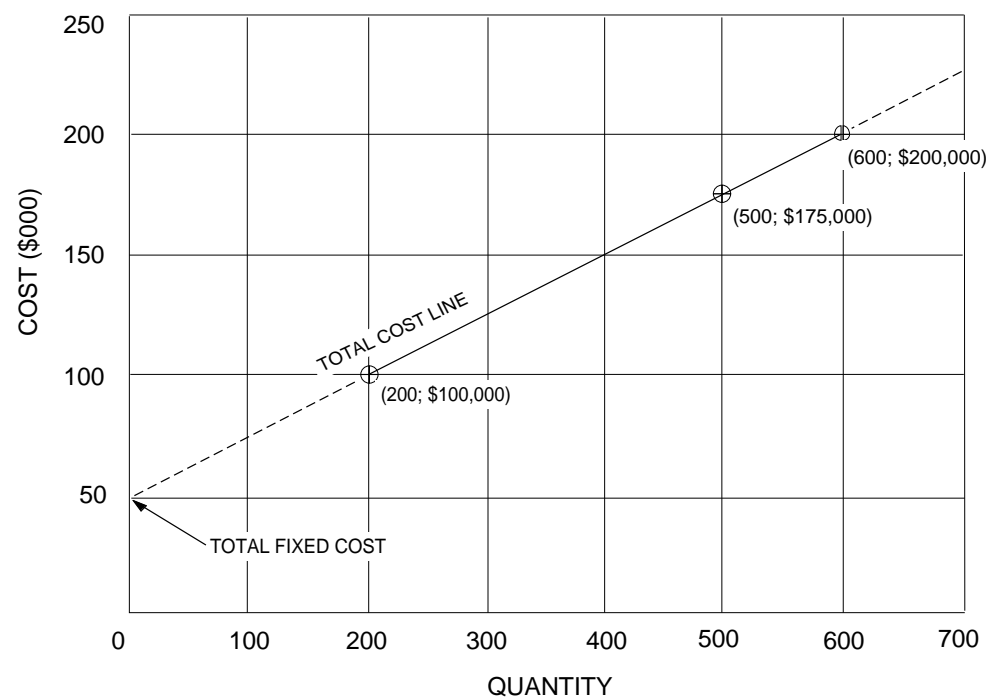
Graphic
Analysis

(continued)

Step 2. Plot the available cost-volume data.



Step 3. Fit a straight line to the data.



(example continued on next page)

6.3.2 Linear Cost-Volume Relationship

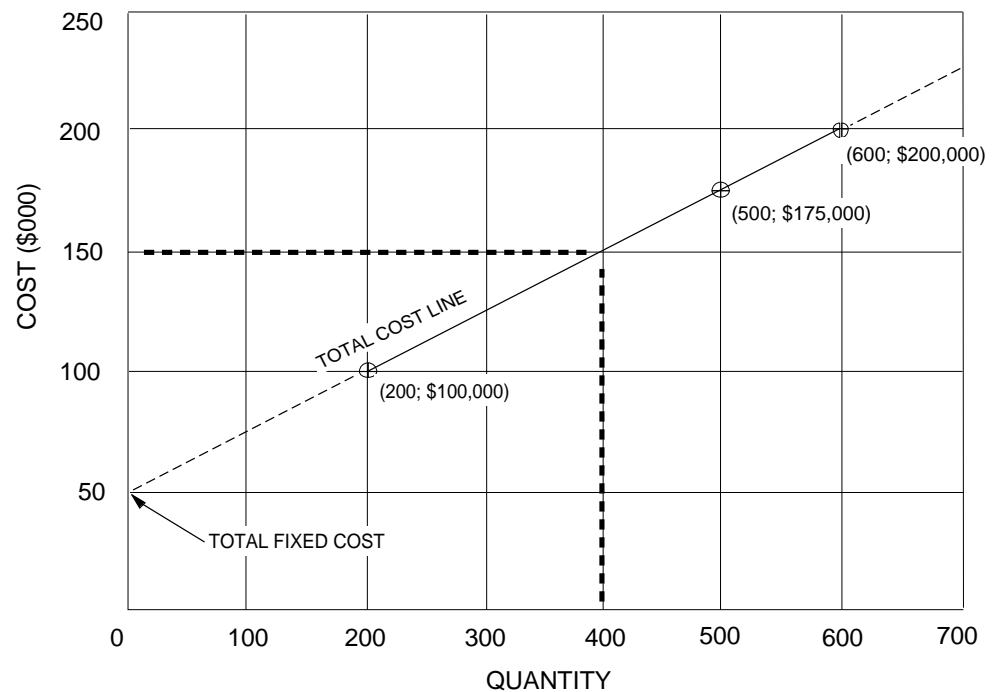
(continued)

Example:
Graphic
Analysis
(continued)

Step 4. Estimate the cost for a given volume.

From the graph, you can estimate that the total cost of 400 units will be \$150,000.

In addition you can also estimate the cost of making zero units. The cost of making zero units, \$50,000, is the fixed cost for this set of data.



Since the graph demonstrates that the data form a straight line, we can use any two points to calculate the equation of the line. Follow the procedures in the section on Algebraic Analysis of the Linear Cost-Volume Relationship.

6.3.3 Cost-Volume-Profit Relationship

Introduction	Until now, we have only looked at the cost-volume relationship. Now, we are going to expand that relationship to consider the relationship between cost, volume, and <i>profit</i> .
--------------	--

Equation Development	The revenue taken in by a firm is equal to cost plus profit. That can be written:
-------------------------	--

$$\text{Revenue} = \text{Total Cost} + \text{Profit}$$

We have already seen that total cost (TC) is:

$$\text{TC} = \text{FC} + (\text{VC}_U * \text{Vol})$$

Using this information, we can rewrite the Revenue equation as:

$$\text{Revenue} = \text{FC} + (\text{VC}_U * \text{Vol}) + \text{Profit}$$

In the cost-volume-profit equation, Profit can be positive, negative, or zero. If Profit is negative, we normally refer to it as a loss. If Profit is zero, the firm is breaking even, no profit or loss. If we let P stand for Profit, we can write the equation:

$$\text{Revenue} = \text{FC} + (\text{VC}_U * \text{Vol}) + P$$

Revenue is equal to selling price per unit (SPU) multiplied by volume.

$$\text{Revenue} = \text{SP}_U * \text{Vol}$$

If we assume that the firm makes all the units that it sells, and sells all the units that it makes, we can complete the cost-volume-profit equation:

$$\text{SP}_U * \text{Vol} = \text{FC} + (\text{VC}_U * \text{Vol}) + P$$

(continued on next page)

6.3.3 Cost-Volume-Profit Relationship

(continued)

Application of
the Equation

This equation and limited knowledge of a contractor's cost structure can provide you with extremely valuable information on the effect purchase decisions can have on a firm's profitability.

Example 1: Given the following product information, a firm set the selling price (SP_U) for a new product.

Fixed Cost	=	\$10,000 (per production run)
Variable Cost per Unit	=	\$20
Estimated Volume	=	5,000 Units
Target Profit	=	\$5,000

$$\begin{aligned}
 SP_U * Vol &= FC + (VC_U * Vol) + P \\
 SP_U * 5,000 &= \$10,000 + (\$20 * 5,000) + \$5,000 \\
 SP_U * 5,000 &= \$10,000 + \$100,000 + \$5,000 \\
 SP_U * 5,000 &= \$115,000
 \end{aligned}$$

$$\begin{aligned}
 SP_U &= \frac{\$115,000}{5,000} \\
 SP_U &= \$23.00
 \end{aligned}$$

Example 2: What if you failed to purchase 1,000 units that the firm had considered when setting the price at \$23.00? Sales would be reduced to 4,000 units. How would profit be affected?

$$\begin{aligned}
 SP_U * Vol &= FC + (VC_U * Vol) + P \\
 \$23 * 4,000 &= \$10,000 + (\$20 * 4,000) + P \\
 \$92,000 &= \$10,000 + \$80,000 + P \\
 \$2,000 &= P
 \end{aligned}$$

Profit decreases from the estimated \$5,000 (See Example 1) to \$2,000, a decrease of \$3,000. The \$2,000 is only 40 percent of the original \$5,000 projection.

(examples continued on next page)

6.3.3 Cost-Volume-Profit Relationship

(continued)

Application of
the Equation
(continued)

Example 3: The firm has orders in hand for the initial 5,000 units it had planned to produce. Now you are about to purchase 1,000 additional units. The total production run will now be 6,000 units at a sales price of \$23 per unit. How will profit be affected?

$$\begin{aligned} SP_U * Vol &= FC + (VC_U * Vol) + P \\ \$23 * 6,000 &= \$10,000 + (\$20 * 6,000) + P \\ \$138,000 &= \$10,000 + \$120,000 + P \\ \$8,000 &= P \end{aligned}$$

Profit increases from \$5,000 (See Example 1) to \$8,000, an increase of \$3,000 or 60 percent.

Contribution
Income

The difference between revenue and variable cost is contribution income (CI). The term contribution income comes from the contribution made to covering fixed costs and profit. If contribution income is positive, increasing sales will increase profits or reduce losses. If contribution income is negative, increasing sales will reduce profits or create greater losses.

$$\begin{aligned} \text{Contribution Income} &= \text{Revenue} - \text{Variable Cost} \\ CI &= (SP_U * Vol) - (VC_U * Vol) \\ CI &= (SP_U - VC_U) * Vol \end{aligned}$$

Knowledge of a contractor's cost structure and contribution income can be valuable in analysis of proposed costs.

(continued on next page)

6.3.3 Cost-Volume-Profit Relationship

(continued)

Contribution
Income

(continued)

Example: In evaluating an offeror's proposal for 500 units at \$900 each, your analysis reveals the following cost structure:

Fixed Cost = \$100,000

Variable Cost per Unit = \$1,000

How would this affect your analysis of contract risk?

$$CI = (SP_U - VC_U) * Vol$$

$$CI = (\$900 - \$1,000) * 500$$

$$CI = (-\$100) * 500$$

$$CI = -\$50,000$$

The contribution income from the sale is a negative \$50,000. The firm is substantially worse off for having made the sale. Unless the firm can offer a positive rationale for such a pricing policy, it must be considered as an important factor in analyzing the risk of contract performance.

6.4 FITTING A LINE-OF-BEST-FIT

Section Overview

Overview	<p>This section shows how a straight line may be used in Cost-Volume-Profit analysis and other analyses based on a straight line relationship. A graphical technique for visually fitting a straight line is demonstrated. The algebraic equivalent of fitting a straight line is shown using the equation for a straight line. Another algebraic technique using the squares of the deviations from the line is shown for its mathematical convenience.</p>
----------	--

This section is ended with a cautionary word concerning the uncritical use of computer generated line-of-best-fit calculation is given.

Maps in This Section	<p>In this section are the following maps:</p> <ul style="list-style-type: none">• Fitting a Line-of-Best-Fit• Visually Fitting a Line• Least-Squares-Best-Fit Line Fitting
----------------------	---

6.4.1 Fitting a Line-of-Best-Fit

Introduction	<p>In price analysis, data points usually do not fall exactly on a straight line. Much of the variation in a dependent variable may be explained by a linear relationship with an independent variable, but there are usually random variations that cannot be explained by the line.</p>
Line-of-Best-Fit Minimizes Error	<p>The purpose of a line-of-best-fit is to establish a predictive line that produces the best estimates of the dependent variable. This is done by finding a line that minimizes the distance between known data points and the line. Data points will not all fall on the line because of estimating error caused by random variations.</p> <p>The line can be fit visually, mathematically, or with the help of a calculator or computer. The final equation will depend on the method used and the skill of the estimator.</p>
Applications	<p>The line-of-best-fit has many applications in cost estimating and analysis. In this section, we will closely examine one important application, Cost-Volume-Profit analysis. Others include time-series forecasting in economic trend analysis and cost estimating relationship development. Developing a line-of-best-fit is vital to the application of these techniques.</p>

6.4.2 Visually Fitting a Line

Introduction

One method of fitting a line to a set of data is visual analysis. This method involves graphing the data, and then drawing a straight line through the data so that the absolute vertical distance between the data points and the line is minimized. Absolute distance is distance without consideration of sign of the data point's distance from the line.

This method can be improved with a bit of knowledge about the mathematically calculated line-of-best-fit. Any straight line of best fit must pass through the average of the independent or X variables and the average of the dependent or Y variables. The point is commonly called (\bar{X}, \bar{Y}) . The $\bar{}$ (read “bar”) over each letter refers to the average of the values of that variable used in the analysis.

Three-Step Process

Visually fitting a line is a three-step process:

- Step 1. Graph the known data.**
- Step 2. Find the point representing the average of the X values and the average of the Y values, (\bar{X}, \bar{Y}) .**
- Step 3. Draw a line through the (\bar{X}, \bar{Y}) and the data so that it minimizes the distance between the line and the data points.** (A clear plastic ruler is useful for drawing this line, because it permits you to see all data points at all times.)

We will use this technique in later sections to fit lines to available data. In each case we will be attempting to predict a dependent variable, usually cost or price, based on changes in the independent variable under examination. In the following example, we will simply refer to the independent variable as X and the dependent variable as Y.

(continued on next page)

6.4.2 Visually Fitting a Line

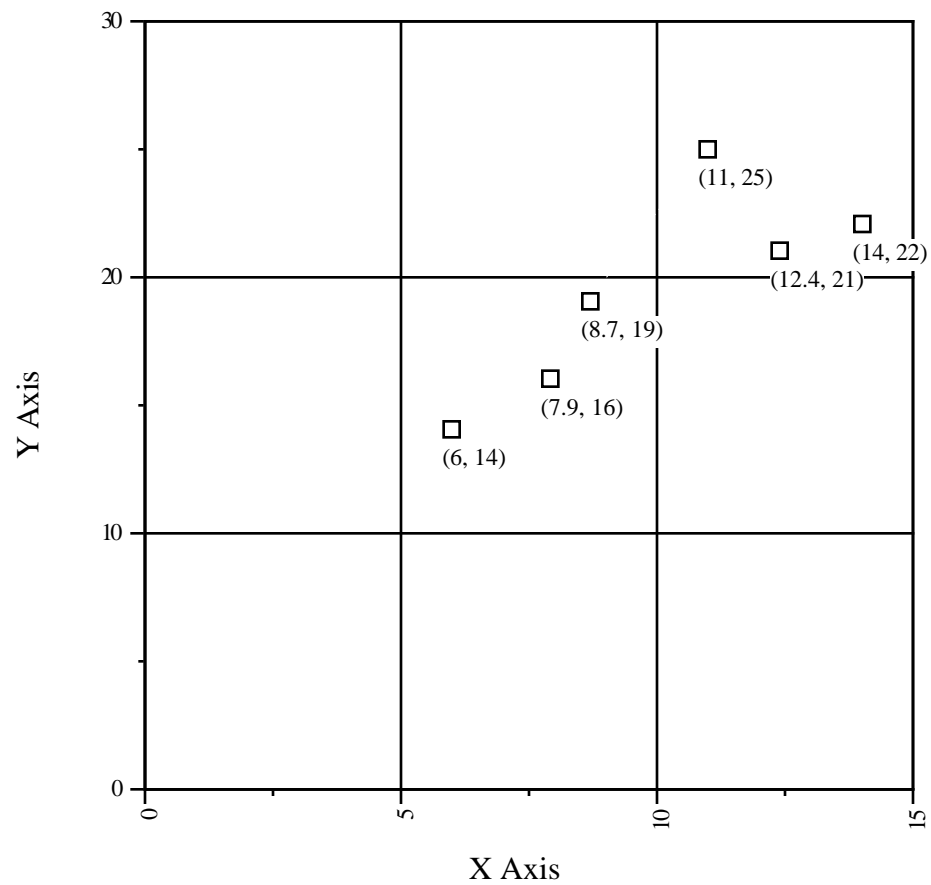
(continued)

Three-Step
Process
(continued)

Example: Given the following data, use visual analysis to develop a predictive equation.

DATA FOR ANALYSIS	
X	Y
6.0	14.0
7.9	16.0
8.7	19.0
11.0	25.0
12.4	21.0
14.0	22.0

Step 1. Plot the data.



(continued on next page)

6.4.2 Visually Fitting a Line

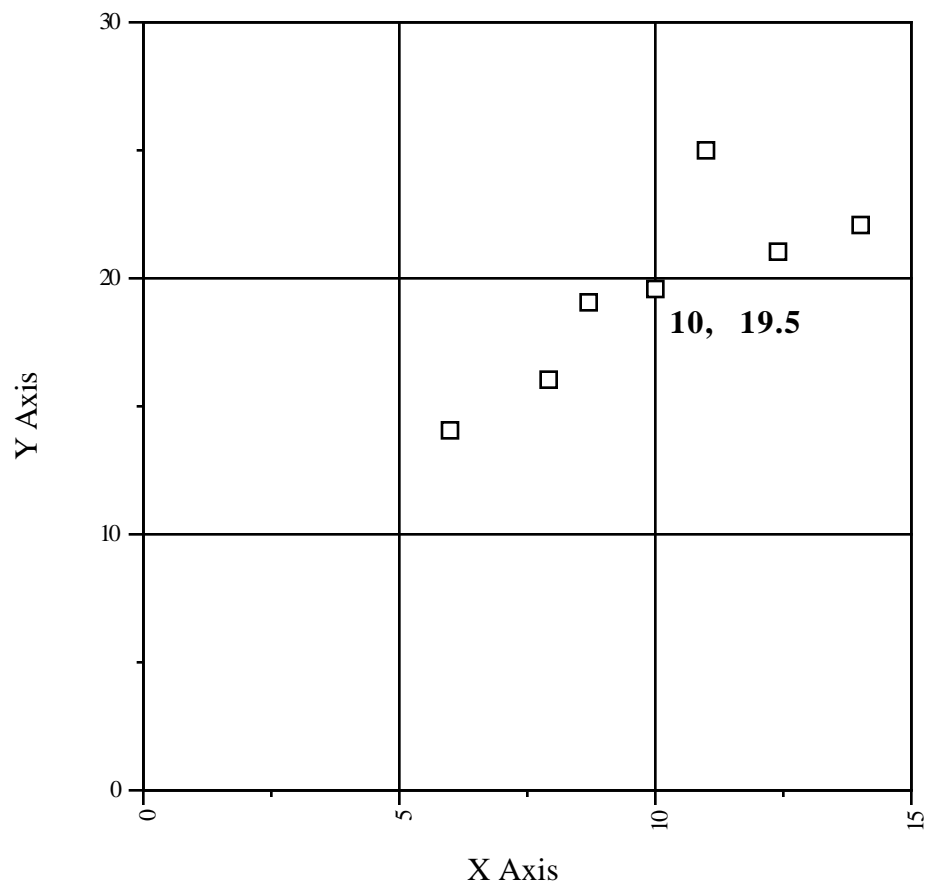
(continued)

Three-Step
Process
(continued)

Step 2. Find and plot (\bar{X}, \bar{Y}) .

$$\bar{X} = \frac{6.0 + 7.9 + 8.7 + 11 + 12.4 + 14.0}{6} = 10$$

$$\bar{Y} = \frac{14.0 + 16.0 + 19.0 + 25.0 + 21.0 + 22.0}{6} = 19.5$$

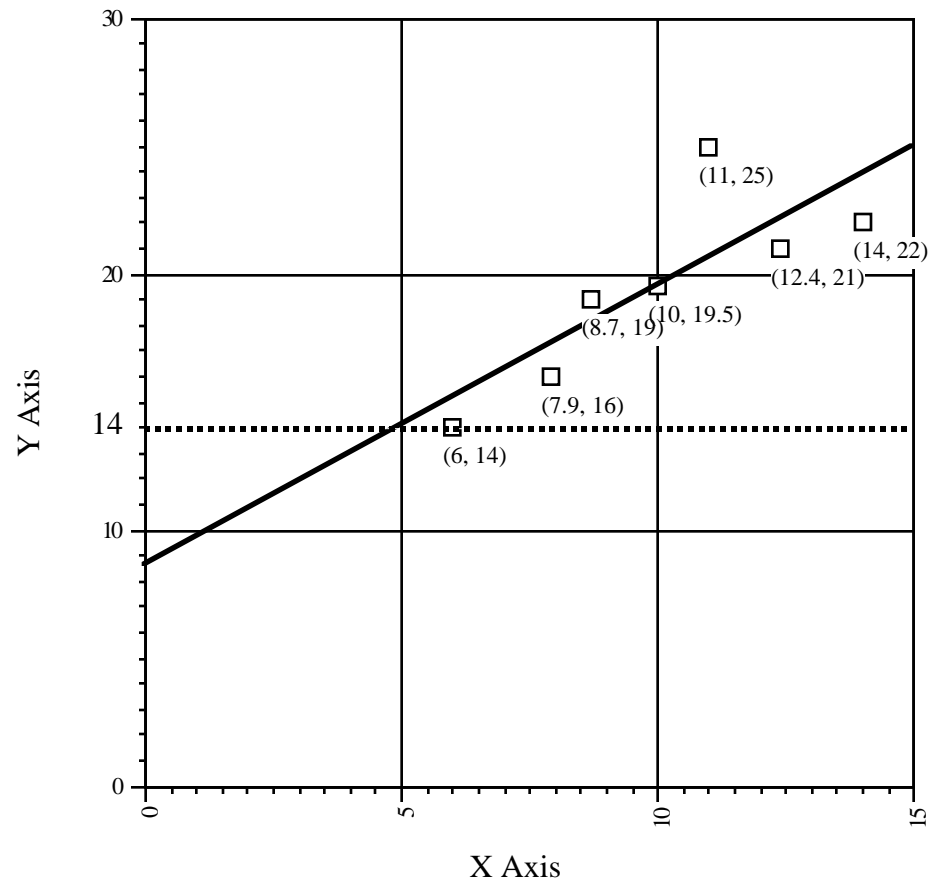


(continued on next page)

6.4.2 Visually Fitting a Line
(continued)

Three-Step
Process
(continued)

Step 3. Fit a line through (\bar{X}, \bar{Y}) as shown in graph.



(continued on next page)

6.4.2 Visually Fitting a Line

(continued)

Developing an
Estimating
Equation

After the line has been fit using a graph, predictions can be made either by using the line or by using an estimating equation developed using data from the line.

To demonstrate, we will generalize a procedure that we used to estimate Variable Cost per Unit (VC_U) and Fixed Cost (FC) in Cost-Volume-Profit analysis.

Instead of using the equation $TC = FC + (VC_U * Vol)$, we will use the general equation for a straight line:

$$Y = A + BX$$

where:

Y = the dependent variable (Total Cost — TC in the Cost-Volume-Profit equation is one example)

A = the Y intercept; the value of Y when X is zero (Fixed Cost — FC in the Cost-Volume-Profit equation is one example)

B = the slope of the line; the change in Y for a one unit change in X. (Variable Cost per Unit — VC_U in the Cost-Volume-Profit equation is one example)

X = the independent variable (Volume — Vol in the Cost-Volume-Profit equation is one example)

Remember that we calculated VC_U using the following equation:

$$VC_U = \frac{\text{Change in Total Cost}}{\text{Change in Volume}}$$

$$VC_U = \frac{\text{Total Cost at Point 2} - \text{Total Cost at Point 1}}{\text{Volume at Point 2} - \text{Volume at Point 1}}$$

$$VC_U = \frac{TC_2 - TC_1}{Vol_2 - Vol_1}$$

(continued on next page)

6.4.2 Visually Fitting a Line

(continued)

Developing an
Estimating
Equation
(continued)

VC_U is the slope of the Cost-Volume-Profit equation, the slope of the general equation (B) is calculated in the same manner:

$$B = \frac{\text{Change in Y}}{\text{Change in X}}$$

$$B = \frac{Y \text{ at Point 2} - Y \text{ at Point 1}}{X \text{ at Point 2} - X \text{ at Point 1}}$$

$$B = \frac{Y_2 - Y_1}{X_2 - X_1}$$

Example: For the graph above, we can use any two points on the line to calculate slope. We already know one; \bar{X} , \bar{Y} is 10, 19.5. We can read another from the graph: 5, 14.

$$B = \frac{Y_2 - Y_1}{X_2 - X_1}$$

$$B = \frac{19.5 - 14}{10 - 5} = \frac{5.5}{5}$$

$$B = 1.1$$

You can calculate the Y intercept using the same method that we used to calculate Fixed Cost in the Cost-Volume-Profit equation. Using a point where X, Y, and B are known, substitute into the general equation and calculate A.

Example: For the graph above, we know that \bar{X} , \bar{Y} : 10, 19.5, falls on the line. Using that point and the calculated slope, 1.1, we can calculate the value of A.

$$\begin{aligned} Y &= A + BX \\ 19.5 &= A + (1.1 * 10) \\ 19.5 &= A + 11 \\ 8.5 &= A \end{aligned}$$

Once you have calculated values for B and A, you can write the equation for the line-of-best-fit. For the graph above, the equation is: $Y = 1.1X + 8.5$. Without reconstructing the chart, this equation can be used to estimate Y for any given value of X within the relevant range (i.e., the range of the data set upon which the calculations are based).

6.4.3 Least-Squares-Best-Fit Line Fitting

Introduction

A line-of-best-fit can be calculated mathematically using a technique known as least-squares-best-fit. This widely accepted technique minimizes the squared difference between available data points and a straight line. Squared differences are used because sums of absolute values of errors cannot be conveniently manipulated mathematically. The difficulty is resolved by minimizing the sum of the square of the errors.

Performing the Calculations

Values for the equation slope (B) and Y intercept (A) may be calculated using the following equations:

$$B = \frac{\sum XY - N\bar{X}\bar{Y}}{\sum X^2 - N\bar{X}^2}$$

$$A = \bar{Y} - B\bar{X}$$

Where:

A = the Y intercept

B = the slope of the equation

N = the number of observations (data points)

X = observed values of the independent variable

\bar{X} = Mean of the independent variable.

Y = corresponding values of the dependent variable

\bar{Y} = Mean of the dependent variable.

Σ indicates the sum of values, for example $\sum XY$ indicates that each X value must be multiplied by the related Y value and all the products summed together.

Example

Develop an equation for the data from page 6-43.

DATA FOR ANALYSIS			
X	Y	X * Y	X ²
6.0	14.0	84.0	36.00
7.9	16.0	126.4	62.41
8.7	19.0	165.3	75.69
11.0	25.0	275.0	121.00
12.4	21.0	260.4	153.76
14.0	22.0	308.0	196.00
$\Sigma X = 60.0$	$\Sigma Y = 117.0$	$\Sigma XY = 1219.1$	$\Sigma X^2 = 644.86$

6.4.3 Least-Squares-Best-Fit Line Fitting (continued)

Example
(continued)

$$\bar{X} = 60 \div 6 = 10$$

$$\bar{Y} = 117 \div 6 = 19.5$$

$$B = \frac{\sum XY - N\bar{X}\bar{Y}}{\sum X^2 - N\bar{X}^2} = \frac{1219.1 - (6 \cdot 10 \cdot 19.5)}{644.86 - 6 \cdot 10^2} = \frac{1219.1 - 1170}{644.86 - 600}$$

$$B = \frac{49.1}{44.86} = 1.0945$$

$$A = \bar{Y} - B\bar{X} = 19.5 - (1.0945 \cdot 10) = 19.5 - 10.945$$

$$A = 8.555$$

Hence, the equation for the line of best fit is as follows:

$$Y = 8.555 + 1.0945X$$

Using
Computers
and
Programmable
Calculators

We will not further examine the calculation of a least-squares-best-fit line-of-best-fit in this course. However, many calculators and computer spread sheet programs can be programmed to automatically perform least-squares-best-fit calculations without extensive rekeying of data.

Many will also automatically calculate statistics that indicate the amount of variation that is explained by the line.

WARNING: Computers and calculators work so well that many people never bother to examine the data used. Even when mathematical calculations are used, a graph is an excellent method of examining the fit of a line to a set of data. Realize, if you program a computer or calculator to fit a straight line through a set of data points that form a definite curve, it *will* fit a straight line through the data. Such a line will have limited value as a cost estimating/analysis tool. A graph will facilitate the identification of situations where a curvilinear trend, multiple trends, or no trend exists.

Many computer programs are capable of producing graphs after fitting a line to a set of data. Of course, you can always manually produce a graph using computer data.

ECONOMIC FORECASTS

Section Overview

Overview

This section discusses economic forecasts as aids in estimating future unknown contract costs. It provides a brief review of published forecasts developed commercially or by Government agencies.

Techniques are shown for developing your forecast. These techniques include forecasting using straight-line graph and index numbers. Procedures are given for developing each of these.

Maps in This Section

In this section are the following maps:

- Sources of Economic Forecasts
- Preparing Economic Forecasts

6.5.1 Sources of Economic Forecasts

Uses of Forecasts in Cost Analysis

Good contracting practice requires you to price contract actions before performance whenever possible. Proactive pricing creates a more positive atmosphere for contract performance, because all parties understand the pricing situation before performance begins.

When the contract will be performed over a long period of time, proactive pricing requires you and the offeror to agree on a price based on unknown costs. Economic conditions can have a significant affect on contract cost and that makes the ability to analyze economic trends very important. Forecasts of material costs and labor rates are essential to pricing long-term contracts.

Sources of Economic Forecasts

Economic forecasts are available everywhere. Even the cartoon pages of your local paper will offer economic forecasts especially when the news is negative. Some of the better sources of information include:

Bureau of Economic Analysis Publications. The Bureau of Economic Analysis, Department of Commerce, publishes the *Business Conditions Digest* and the *Survey of Current Business*. The *Business Conditions Digest* presents almost 500 economic indicators in a form convenient for analysis with different approaches to the study of current business conditions and business prospects including leading economic indicators. The *Survey of Current Business* provides general information on trends in industry and the business outlook. It furnishes economic indexes on business, construction, manufactures, and wholesale trade.

Federal Reserve System. The Board of Governors publishes the *Federal Reserve Bulletin* which includes economic indexes and data on business, commodity prices, construction, labor, manufactures, and wholesale trade. Each bank in the system publishes information each month with special reference to its own Federal Reserve District.

Other Publications. Industry and trade publications frequently provide general forecasts of economic conditions and price changes anticipated in the industry. Local, national, and financial newspapers also provide forecasts of price changes in specific industries.

6.5.2 Preparing Economic Forecasts

Introduction

You may be called upon to analyze or make forecasts of material costs or labor rates in future time periods. In making forecasts about the future, you are making an estimate beyond the range of known data. You must consider available information about historic trends and economic projections for the future. When faced with conflicting information, you must be prepared to exercise judgement in developing your negotiation objectives.

Forecast Term

Forecasting can be divided into two general situations: short-term (up to two years) and long-term (two to ten years). Generally speaking, the longer the forecast, the more difficult the problem. Economists with complex econometric models have difficulty making accurate long-term forecasts.

The time-honored practice in Government acquisition to best fit a straight-line trend model through the historical data is rarely adequate for long-term forecasts. For example, the straight-line forecasts (based on experience from the 1960s) consistently underestimated the double-digit inflation of the 1970s. Accordingly, any model for long-range forecasting must be able to sense and adjust to changing economic conditions.

For short-term forecasting, simple time-series models, such as the straight-line, are still reasonably accurate. Even in making short-term forecasts, judgement must not be lost in the mathematical calculations of analysis.

For example, the data utilized in forecast development will significantly affect the results. If you believe that the future will follow the general pattern developed over the past five or ten years, you would want to use all available data from the period. If you believe that the trend is changing, you would want to place more weight on the most recent years of data. One method of doing this is to simply ignore the early years of data by graphically fitting a straight line through the most recent data, such as the last two years, and extending that straight line into future years for the forecast.

(continued on next page)

6.5.2 Preparing Economic Forecasts

(continued)

Forecast Development

The straight-line time-series approach begins by fitting a straight line to data selected for analysis and is completed by extending the line to the appropriate time period.

You will remember that visually fitting a line is a three-step process:

Step 1. Graph the known data.

Step 2. Find the point representing the average of the X values and the average of the Y values, (\bar{X}, \bar{Y}) .

Step 3. Draw a line through the (\bar{X}, \bar{Y}) and the data so that it minimizes the distance between the line and the data points.

Completing the forecast will require a fourth step.

Step 4. Extend the line to the appropriate time period.

Index Number Forecasting

The same general approach can be used for straight-line forecasting of material prices and index numbers.

Given the following data, we must develop an index number forecast for 1992.

INDEX NUMBER HISTORY	
Year	Index
1986	105.0
1987	107.0
1988	110.0
1989	115.5
1990	119.0
1991	120.0

(Continued on next page)

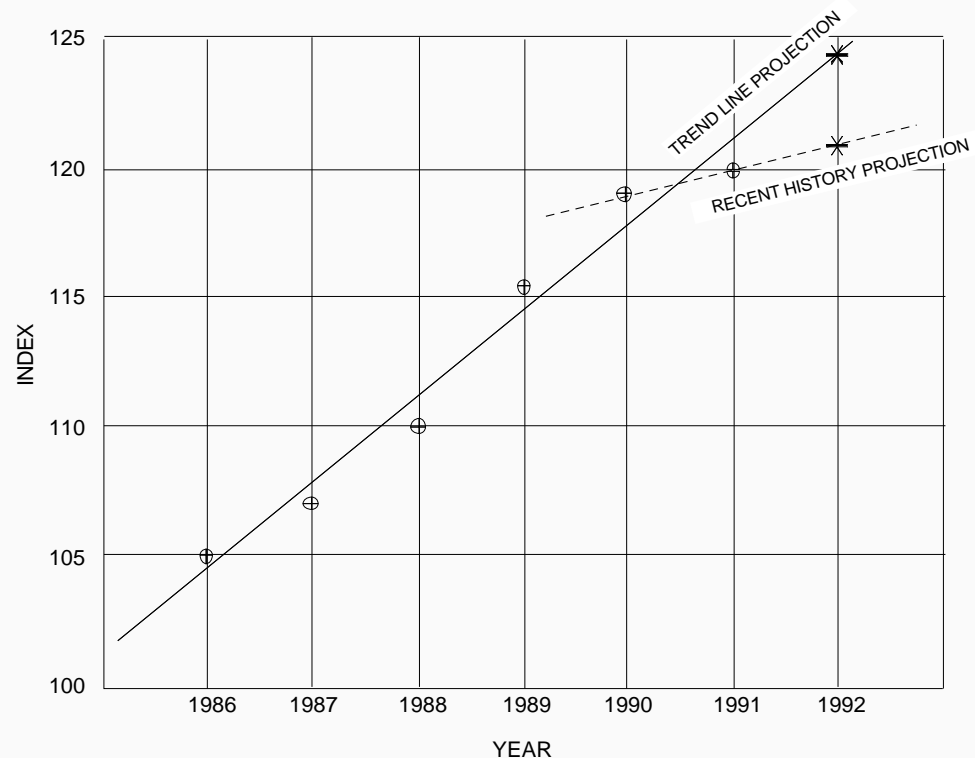
6.5.2 Preparing Economic Forecasts

(continued)

Index Number Forecasting

(continued)

Using Steps 1 to 4 and all data from 1986 to 1991, we would project an index of 124.4 for 1992 (Remember that the best fit line must go through \bar{X} , 1988.5 and \bar{Y} , 112.75.)



Using only the last two years, we would project an index of 121.0. The index you use would be determined by your evaluation of the current economic trend. Is the 1991 index a continuation of the historical trend? Has something changed in the economy that would lead us to expect the trend to change? Depending upon this evaluation, the appropriate index might be 121.0, 124.4, or some index in between. The quality of analysis depends on your judgement as well as your quantitative expertise.

Wage Rate Forecasting

Part of wage rate forecasting is an analysis and projection of current economic trends. We will see in the chapter on direct labor cost analysis that wage rates are also substantially affected by unique situations in a particular region, contractor, plant, and contract. All these factors must be considered in the estimating and analysis of wage rates.

6.6 COST ESTIMATING RELATIONSHIPS

Section Overview

Overview	<p>This section covers linear cost estimating relationships (CERs). Two commonly used CERs are discussed: parametric and cost-to-cost.</p> <p>A six-step procedure for developing a CER is given and, then illustrated by an example.</p> <p>At the end of this section, an example is given for how to use the CER to estimate cost.</p>
Maps in This Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Cost Estimating Relationships• Developing a Cost Estimating Relationship

6.6.1 Cost Estimating Relationships

Introduction

As the name implies, a cost estimating relationship (CER) is used to estimate a particular cost or price by using an established relationship with an independent variable.

If an independent characteristic (driver) that meaningfully relates to cost or prices exists, a CER can be developed. A CER may be mathematically simple in nature, such as a linear function, or it may be represented by much more complex relationships, such as cubic or exponential functions. In this text, we will only consider the development and application of linear CERs.

Cost Estimating Relationship Examples

There are two types of CERs that are commonly used in developing and analyzing cost estimates:

1. parametric relationships
2. cost-to-cost relationships

A *parametric relationship* is a relationship between a parameter (characteristic) of the item or service being purchased and the cost or price of the item. Either physical or performance characteristics can be used in CER development. The characteristic or characteristics selected for CER development are usually not the only ones driving cost, but the movement of cost has been found to be related to changes in these characteristics. By using models that relate changes in cost to changes in these characteristics, and defining these characteristics in the new item, you can predict the cost of the new item.

(continued on next page)

6.6.1 Cost Estimating Relationships

(continued)

Cost Estimating
Relationship
Examples
(continued)

Examples of parametric relationships that have been used in cost estimating and analysis include the following:

PRODUCT	INDEPENDENT VARIABLE
Building Construction	Floor space, roof surface area, wall surface
Gears	Net weight, gross weight, horsepower, number of driving axles, loaded cruising speed
Trucks	Empty weight, gross weight, horsepower, number of driving axles, loaded cruising speed
Passenger Car	Curb weight, wheel base, passenger space, horsepower
Turbine Engine	Dry weight, maximum thrust, cruise thrust, specific fuel consumption, by-pass ratio, inlet temperature
Reciprocating Engine	Dry weight, piston displacement, compression ratio, horsepower
Sheet Metal	Net weight, percent of scrap, number of holes drilled, number of rivets placed, inches of welding, volume of envelope
Aircraft	Empty weight, speed, useful load, wing area, power, landing speed
Diesel Locomotive	Horsepower, weight, cruising speed, maximum load on standard grade at standard speed

A *cost-to-cost relationship* is a relationship between one cost and another cost. This type of relationship is most commonly used in estimating direct labor hours. If a relationship can be established between different elements of cost, CER development can reduce the estimating effort required while increasing estimating accuracy.

For example, as the number of senior engineering labor hours increase, the amount of clerical support may also be expected to increase. If the relationship is constant, it may be possible to estimate the clerical support hours based on their historical relationship with senior engineering hours.

6.6.2 Developing a Cost Estimating Relationship

Six Steps in
Developing a
Cost Estimating
Relationship

If you are developing the CER for cost analysis, you **MUST** follow these steps. If you are analyzing offeror CER development you **MUST** determine whether these steps were performed properly.

STEP	ACTION
1	<p>Designate and define the dependent variable (cost dollars, hours, and so forth.)</p> <p>The developer must define what the CER will be used to estimate. Will the CER be used to estimate price, cost dollars, labor hours, or some other measure of cost? Will the CER be used to estimate total product cost or estimate the cost of one or more components? The better the definition of dependent variable, the easier it will be to gather comparable data for CER development.</p>
2	<p>Select variables to be tested for developing estimates of the dependent variable.</p> <p>In selecting potential independent estimating variables, the CER developer should draw on personnel experience, the experience of others, and published sources of information. When developing a CER for a new state-of-the-art item, it is especially important for the developer to consult experts experienced with new technology and production methods.</p> <p>In selecting the independent variable, several factors should be considered.</p> <ul style="list-style-type: none"> • Variables should be quantitatively measurable. Parameters, such as maintainability, are difficult to use in estimating because they are difficult to measure quantitatively. • Data availability is also important. If historical data cannot be obtained, it will be impossible to analyze and use the variable as a predictive tool. For example, an independent variable, such as physical dimensions or parts count, would be of little value during the conceptual phase of system development when the characteristics are unknown. • Number of potential plot points. Be especially wary of CERs based on 2 or 3 plot points. • If there is a choice between developing a CER based on performance or physical parameters, performance parameters are generally the better choice, because performance parameters are usually known before design characteristics.

(continued on next page)

6.6.2 Developing a Cost Estimating Relationship

(continued)

Six Steps in
Developing a
Cost Estimating
Relationship
(continued)

STEP	ACTION
3	<p>Collect data concerning the relationship between the dependent and independent variables.</p> <p>The collection of data is often the most difficult and time-consuming</p>
4	<p>Explore the relationship between the dependent and independent variables.</p> <p>The purpose here is to determine the degree of relationship between the independent and dependent variables. This phase of establishing a CER can involve a variety of analytical techniques from simple graphic analysis to complex mathematical analysis. Linear line-of-best-fit analysis is one mathematical technique that is commonly used.</p>
5	<p>Select the relationship that best predicts the dependent variable.</p> <p>After exploring a variety of relationships, we must select the one that best describes the data. In graphing, this would be the independent variable that best predicts the values of the dependent variable. A high correlation (relationship) between a potential independent variable and the dependent variable usually indicates that the independent variable will be a good predictive tool.</p>
6	<p>Document your findings.</p> <p>Documentation of the CER is essential to permit others involved in the estimating process to trace the steps involved in developing the relationship. Documentation should involve the parameters tested, the data gathered, sources of data, time period of the data, and any adjustments made to the data.</p>

(continued on next page)

6.6.2 Developing a Cost Estimating Relationship

(continued)

Example

You are analyzing the prices proposed for the construction of a new house and decide to develop a CER.

Step 1. Designate and define the dependent variable.

In this case we will attempt to directly estimate the cost of a new house excluding the cost of land.

Step 2. Select item characteristics to be tested for estimating the dependent variable.

A variety of house characteristics could be used to estimate cost. These include such characteristics as square feet of living area, exterior wall surface area, number of baths, and others.

Step 3. Collect data concerning the relationship between the dependent and independent variables.

HOUSE MODEL	UNIT COST	BATHS	SQ. FT. LIVING AREA	SQ. FT. EXTERIOR WALL SURFACE
Burger	\$166,500	2.5	2,800	2,170
Metro	\$165,000	2.0	2,700	2,250
Suburban	\$168,000	3.0	2,860	2,190
Executive	\$160,500	2.0	2,440	1,990
Ambassador	\$157,000	2.0	1,600	1,400
New Home		2.5	2,600	2,100

6.6.2 Developing a Cost Estimating Relationship

(continued)

Example
(continued)

Step 4. Explore the relationship between the dependent and independent variables.

As stated earlier, analysis of the relationship between the item characteristic and the dependent variable may be done, using a variety of techniques. Here we will use graphic analysis: baths, living area, and exterior wall surface area.

Step 5. Determine the relationship that best predicts the dependent variable.

Initial Graphs. The graph relating cost and the number of baths, appears to depict a relationship between the number of baths and house price. The relationship, however, does not appear to be a good estimating tool, since three houses with a nearly \$8,000 price difference have the same number of baths.

The graph that relates cost to square feet of living area, appears to depict a strong linear relationship between house cost and living area.

The graph that relates cost to exterior wall surface area also appears to depict a linear relationship between house cost and the independent variable. Based on this graphic analysis, it appears that square feet of living area and exterior wall surface have the most potential for development of a CER. We can visually fit a straight line to each relationship by drawing a line through the average of the X values and the average of the Y values (\bar{X} , \bar{Y}) and minimizing the distance between the data points and the line.

(example continued on next page)

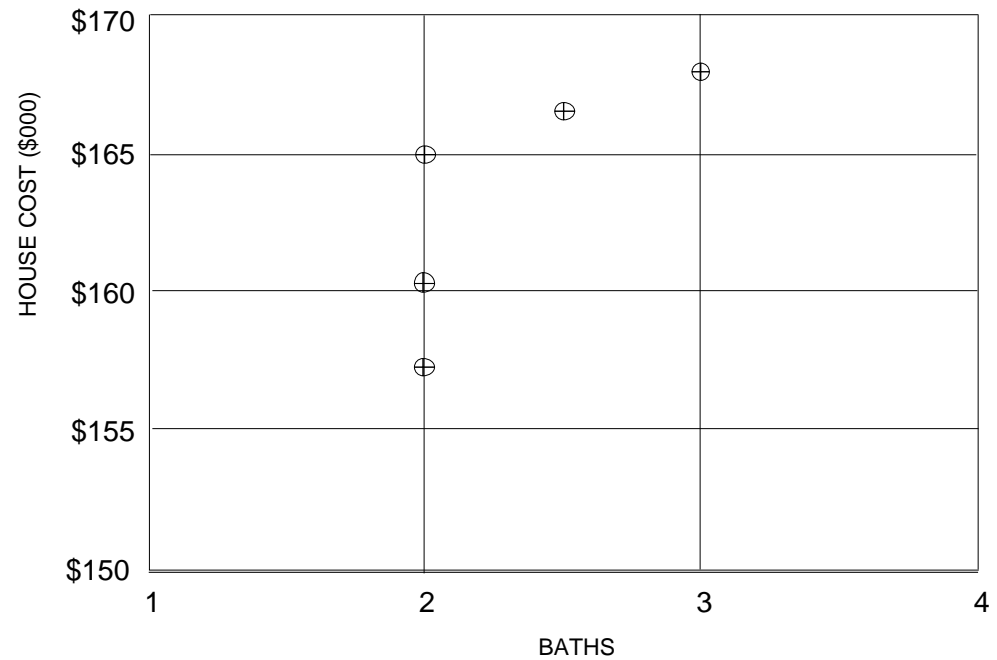
6.6.2 Developing a Cost Estimating Relationship

(continued)

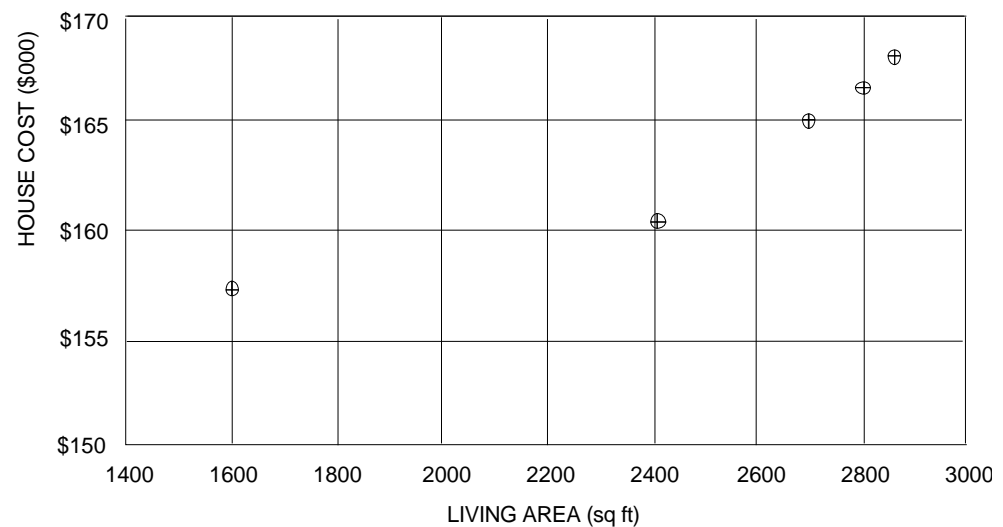
Example

(continued)

Relating cost to the number of baths:



Relating cost to square feet of living area:



(example continued on next page)

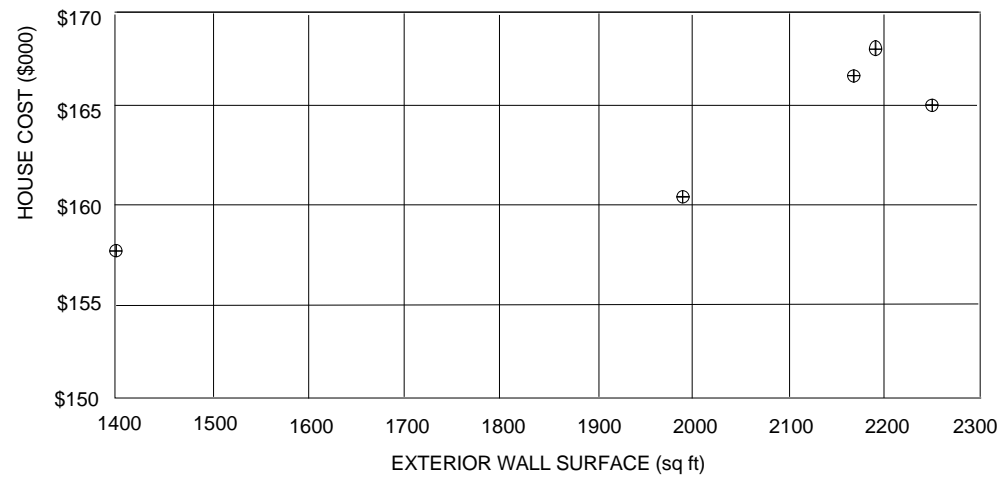
6.6.2 Developing a Cost Estimating Relationship

(continued)

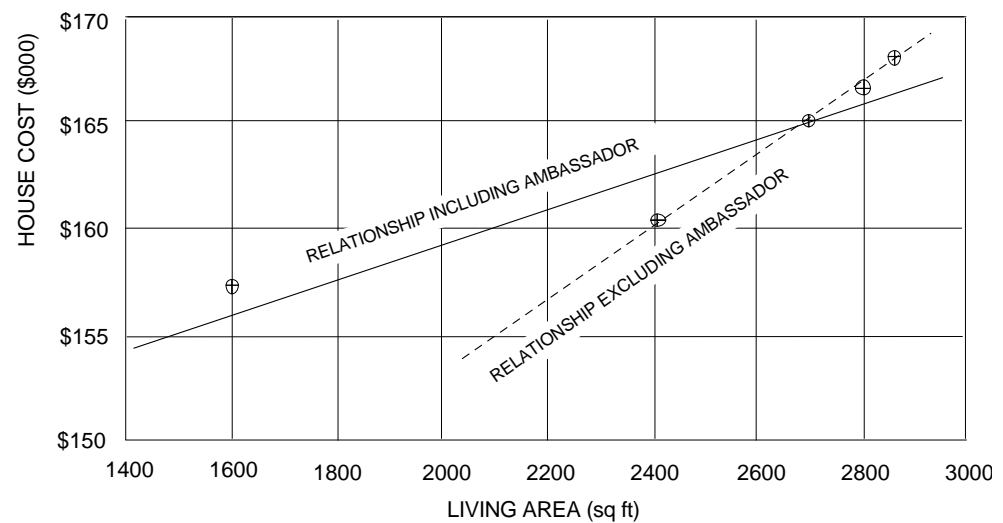
Example

(continued)

Relating cost to exterior wall surface area:



Linear relationship of cost to living area:



(example continued on next page)

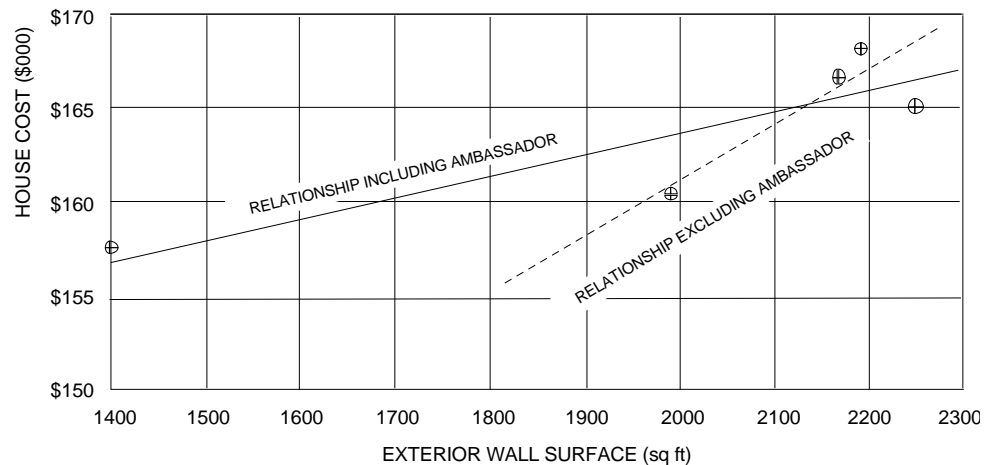
6.6.2 Developing a Cost Estimating Relationship

(continued)

Example

(continued)

Linear relationship of cost to exterior wall surface area:



Consider Analysis Results and Other Data. Viewing both of these relationships, we might question whether the Ambassador model data should be included in developing our CER. In developing a CER, you need not use all available data if all data is not comparable. However, you should not eliminate data just to get a better-looking relationship. After further analysis, we find that the Ambassador's size is substantially different from the other houses for which we have data and the house for which we are estimating. This substantial difference in size might logically affect relative construction cost. Based on this information, you might decide not to consider the Ambassador data in CER development.

(example continued on next page)

6.6.2 Developing a Cost Estimating Relationship

(continued)

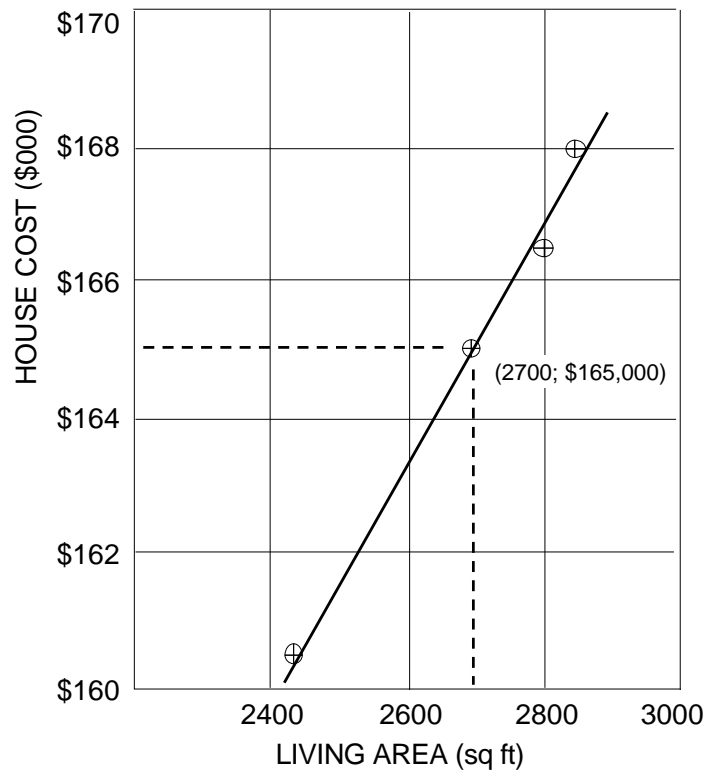
Example
(continued)

Final Analysis. If you exclude the Ambassador data, you find that the fit of a straight-line relationship of cost to the exterior wall surface is improved. The relationship between cost and square feet of living area is even closer, almost a straight line. If you had to choose one relationship, you would probably select living area over exterior wall surface because living area has so much less variance from the trend line.

If the analysis of these relationships did not reveal a useful predictive relationship, you might consider combining two or more of the relationships already explored or exploring new relationships. However, since the relationship between living area and price is so close, we may reasonably use it for our CER.

Step 6. Document your findings.

In documenting our findings, we can relate the process involved in selecting living area for price estimation. We may then present the graph, shown on the next page, developed as an estimating tool.



6.6.2 Developing a Cost Estimating Relationship

(continued)

Example
(continued)

We might also convert the graphic relationship to a mathematical one. This could be done by following the procedures identified in the section on developing a line-of-best-fit.

The cost estimating relationship (CER) would be:

$$Y = \$117,750 + (\$17.50 * \text{Sq Ft of Living Area})$$

Using CERs To
Estimate Cost

Once developed, a CER can be used to estimate costs in similar circumstances.

For example, applying our new CER to the estimation of cost for our new 2,600 square-foot house, we would estimate:

$$Y = \$117,750 + (\$17.50 * 2,600)$$

$$Y = \$117,750 + \$45,500$$

$$Y = \$163,250 \text{ estimated price}$$

CERs, like most other tools of cost analysis, **MUST** be used with buyer judgement. Judgement is required to evaluate the historical relationships in the light of new technology, new design, and other similar factors. Therefore, a knowledge of the factors involved in CER development is essential to proper application of the CER. Blind use of any tool can lead to disaster.

6.7 MOVING AVERAGES

Section Overview

Overview	This section discusses the technique of moving averages, used to smooth out random fluctuations in cost data. The procedure for calculating moving averaging is given and illustrated by an example. Two special types of moving averages (weighted and double moving average) are described.
----------	---

Maps in This Section	<p>In this section are the following maps:</p> <ul style="list-style-type: none">• Use of Moving Averages• Developing a Simple Moving Average• Other Types of Moving Averages
----------------------	---

6.7.1 Uses of Moving Averages

Introduction

A moving average is used to smooth random fluctuations in data collected over several time periods. Moving averages are commonly used to estimate product demand and a variety of production-related elements such as scrap and rework rates.

In a simple moving average, data collected over two or more time periods is summed and divided by the number of time periods. That number then becomes an estimate for future time periods. As data from a new time period is added, data from the earliest time period is dropped from the average.

For example, a 12-month moving average uses data from the most recent 12 months. A 6-month moving average uses data from the last 6 months.

Smoothing Variation Using the Moving Average

The moving average has the effect of smoothing minor fluctuations in data collected over time. In fact, a perfectly regular periodic pattern can be eliminated from estimates by using the appropriate moving average. The moving average will yield a smooth trend only if the variations to be eliminated are essentially random in both nature and amplitude and the trend is basically linear. By averaging the effects of the seasonal and other short-term variations, the resultant line will express the approximate general trend of long-term variations.

(continued on next page)

6.7.2 Developing a Simple Moving Average

Procedure for Developing Moving Averages

There are three steps to be followed in developing or analyzing of a moving average:

STEP	ACTION
1	<p>Collect historical data required for moving average calculation.</p> <p>When moving averages are used to estimate rates, such as scrap rates, collect data on both the rate numerator and denominator. Do not develop a moving average based on historical rates.</p>
2	<p>Determine an appropriate averaging period.</p> <p>The longer the moving average period, the greater the smoothing effect. If there is no trend, greater smoothing may be desirable. If there is a trend, a long smoothing period may obscure the trend. Shorter smoothing periods produce more random fluctuation in the averages but will follow possible trends more closely. You should always be careful when extremely long smoothing periods are used without justification.</p>
3	<p>Determine how well the moving average predicts costs.</p> <p>One way of examining an estimator's selection of a smoothing period is to graph the actual period data and compare it with the moving average.</p>

(continued on next page)

6.7.2 Developing a Simple Moving Average

(continued)

Example:
Developing
Moving
Averages

The following table presents a situation where costs are declining. Two possible moving average periods are considered, 3-months and 12-months.

Looking at the actual cost and the two moving averages, it appears that the 3-month moving average is doing a better job of estimating. When you graph the data, the superiority of the 3-month moving average in this situation becomes obvious.

Moving Average Comparison			
Month	Cost	3-Month Average	12-Month Average
Jan 90	\$240		
Feb	250		
Mar	260	\$250	
Apr	230	247	
May	245	245	
Jun	225	233	
Jul	240	237	
Aug	224	230	
Sep	228	231	
Oct	223	225	
Nov	223	225	
Dec	227	224	\$235
Jan 91	218	223	233
Feb	216	220	230
Mar	228	221	227
Apr	220	221	226
May	209	219	223
Jun	216	215	223
Jul	220	215	221
Aug	209	215	220
Sep	204	211	218
Oct	205	206	216
Nov	220	210	216
Dec	220	208	214

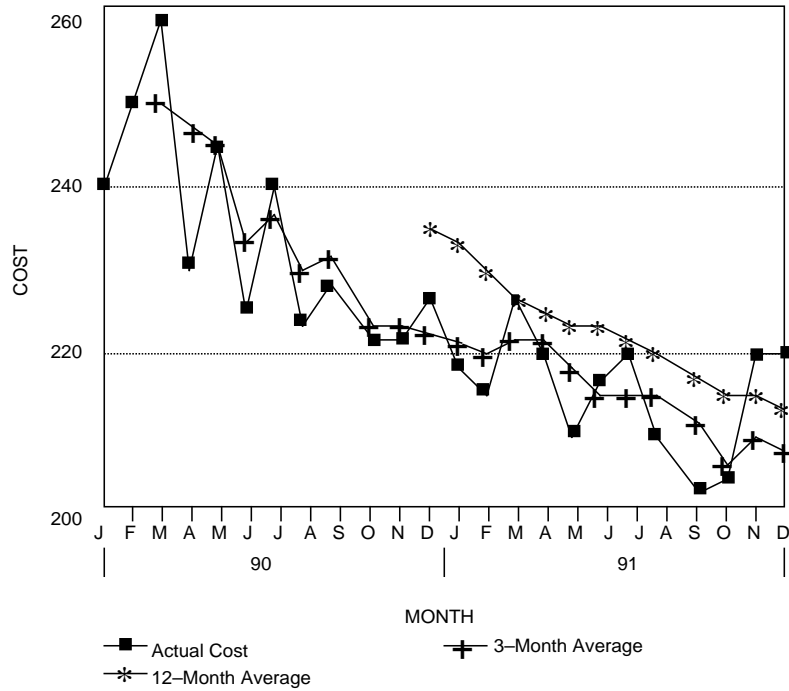
(example continued on next page)

6.7.2 Developing a Simple Moving Average

(continued)

Example:
Developing
Moving
Averages
(continued)

The following chart shows a graphical depiction of the data in the table above.



6.7.3 Other Types of Moving Averages

Introduction

There are several ways of calculating moving averages. The most common is the method described above, the simple moving average. The simple moving average is particularly useful when no trend exists in the data. When patterns exist in the data, use of a weighted moving average or the double moving average may be appropriate.

Weighted Moving Average

The weighted moving average can be used to control response to patterns in the data. The simple moving average gives equal weight to data from all periods. The weighted moving average provides for assigning different weights to data from different periods, as long as the sum of the weights is equal to 1.00.

For example, if an estimator feels that the most recent data is the best predictor but wants to consider a longer history in the estimate, weights could be assigned to a moving average. Using a 3-month moving average, data from Months 1 and 2 could each be multiplied by .25. The most recent data could be multiplied by .50. Note that the weights total 1.00 ($.25 + .25 + .50$).

By assigning weights in this manner, the estimator has made the moving average more sensitive to change. The most recent month is twice as important (a weight of .50 compared to .25) as any other month.

There are two questions of particular concern in analyzing an estimate developed through use of a weighted moving average.

- ***What is the effect of using the assigned weights in calculating the moving average?***

If later data have the greatest weight, the average is more sensitive to change than the simple moving average covering the same number of periods. If earlier data have the greatest weight, the average is less sensitive.

- ***What rationale was used in selecting the assigned weights?***

In analyzing this estimate, you would want to understand the rationale used in selecting the assigned weights. Does it make sense for the average to be more or less sensitive to change?

(continued on next page)

6.7.3 Other Types of Moving Averages

(continued)

Double Moving Average

This type of moving average may be used in situations where a definite trend in the data has been identified. The double moving average uses a moving average and a moving average of moving averages to develop an estimate. The technique uses the lag between the moving average and the moving average of moving averages to estimate the trend.

If an offeror, auditor, or technical analyst uses this technique, consult with appropriate audit or technical personnel for a detailed explanation of the method and its application.

IMPROVEMENT CURVE ANALYSIS

Section Overview

Overview	This section discusses the concept of the improvement curve, situations for its application, and factors that influence and contribute to the curve. Two basic types of improvement curves—Unit Improvement Curve and Cumulative Average Improvement Curve—are presented and their differences discussed.
----------	---

Detailed interpretations of the Improvement curve, including an example with calculations and logarithmic plotting of data, are given using unit data and unit theory, and using lot data.

Maps in This Section

In this section are the following maps:

- Improvement Curve Analysis
 - Basic Improvement Curve Theories
 - Interpret Improvement Curve Using Unit Data and Unit Theory
 - Interpret Improvement Curve Using Lot Data
-

6.8.1 Improvement Curve Analysis

Introduction

You may have learned about improvement curve theory using the name learning curve theory. Today, many experts feel that the term learning curve implies too much emphasis on learning by first-line workers. They point out that the theory is based on improvement by the entire organization, not just first-line workers. Alternative names for the theory include improvement curve, cost-quantity curve, experience curve, and others. None have been universally accepted. In this text, we will use the term improvement curve to emphasize the need for efforts by the entire organization to make improvements to reduce costs.

Improvement curve theory is used to estimate recurring resource requirements in operations that are performed repetitively. The theory can be used to estimate direct labor hours, units of material required, or the cost of subcontracted items.

Improvement Curve Theory

History. The improvement curve is based on the concept that, as a task is performed repetitively the time required to perform the task will decrease. That part of concept is not new, but T. P. Wright pioneered the idea that improvement could be estimated mathematically. In February 1936, Wright published his theory in the *Journal of Aeronautical Sciences* as part of an article entitled “Factors Affecting the Cost of Airplanes.” Wright's findings showed that, as the number of aircraft produced in sequence increased, the direct labor input per airplane decreased in a regular pattern that could be estimated mathematically.

During the mobilization for World War II, both aircraft companies and the government became interested in the theory. Among other considerations, the theory implied that a fixed amount of labor and equipment could be expected to produce larger and larger quantities of defense products as production continued.

(continued on next page)

6.8.1 Improvement Curve Analysis

(continued)

Improvement
Curve Theory
(continued)

After World War II, the Government engaged the Stanford Research Institute (SRI) to study the validity of the improvement curve concept. The study analyzed essentially all World War II airframe direct labor input data to determine whether there was sufficient evidence to establish a standard estimating model. The SRI study validated a mathematical model based on the World War II findings that could be used as a tool for price analysis. However, that model was slightly different than the one originally offered by Wright.

Since World War II, the improvement curve concept has been used by government agencies to aid in pricing contracts. Over the years, the improvement curve has been used as a contract estimating and analysis tool in a variety of industries including airframes, electronics systems, machine tools, shipbuilding, missile systems, and depot level maintenance of equipment. Improvement curves have also been applied to service and construction contracts where tasks are performed repetitively.

Improvement
Situations

The improvement curve cannot be used as an estimating tool in every situation. Situations that provide an opportunity for improvement or reduction in production hours are the types of situations that lend themselves to improvement curve application. Use of the improvement curve should be considered in situations where there is:

- ***A high proportion of manual labor***

It is more difficult to reduce the labor input when there is limited labor effort, the labor effort is machine paced, or individual line workers only touch the product for a few seconds.

- ***Uninterrupted production***

As more and more units are produced, the firm becomes more adept at production and the labor hour requirements are reduced. If supervisors, workers, tooling, or other elements of production are lost during a break in production, some improvement will also likely be lost.

(continued on next page)

6.8.1 Improvement Curve Analysis

(continued)

Improvement Situations

(continued)

- ***Production of complex items***

The more complex the item the more opportunity there is to improve.

- ***No major technological change***

The theory is based on continuing minor changes in production and in the item itself. However, if there are major changes in technology, the benefit of previous improvement may be lost.

- ***Continuous pressure to improve***

The improvement curve does not just happen; it requires management effort. The management of the firm must exert continuous pressure to improve. This requires investment in the people and equipment needed to obtain improvement.

Improvement Factors

There are many factors that must be considered in examining the nature of improvement:

- ***Job familiarization by workers***

As noted earlier, many feel that this element has been overemphasized over the years. Still, workers do improve from repetition and that improvement is an important part of the improvement curve.

- ***Improved production procedures***

As production continues, both workers and production engineers must constantly be on the lookout for better production procedures.

- ***Improved tooling and tool coordination***

Part of the examination of production procedures must consider the tooling used for production. Tooling improvements offer substantial possibilities for reduction of labor requirements.

(continued on next page)

6.8.1 Improvement Curve Analysis

(continued)

Improvement
Factors

(continued)

- ***Improved work flow organization***

Improving the flow of the work can substantially reduce the labor effort that does not add value to the product. Needless movement of work in progress can add significant amounts of labor effort.

- ***Improved product producibility***

Management must constantly consider product changes that will make the product easier to produce without degrading the quality of the final product.

- ***Improved engineering support***

The faster production problems can be identified and solved the less production labor effort will be lost waiting for problem resolution.

- ***Improved parts support***

As production continues, better scheduling should be possible to eliminate or significantly reduce worker time lost waiting for supplies. In addition, production materials more appropriate for production can be identified and introduced to the production process.

6.8.2 Basic Improvement Curve Theories

Introduction	Over the years since 1936, many different formulations have been introduced to explain and estimate the improvement that takes place in repetitive production efforts. Of these, the two most popular are the unit improvement curve and the cumulative average improvement curve.
--------------	--

Unit Improvement Curve	<p>The unit improvement curve is the model validated by the SRI study. The formulation is also known by two other names: Crawford curve, after one of the leaders of the SRI research; and Boeing curve, after one of the firms that first embraced its use.</p> <p>Unit curve theory can be stated as follows:</p> <p><i>As the total volume of units produced doubles the cost per unit decreases by some constant percentage.</i></p> <p>The constant percentage by which the costs of doubled quantities decrease is called the rate of learning. The term “slope” in the improvement curve analysis is the difference between 100 percent and the rate of learning. If the rate of learning is 20 percent, the improvement curve slope is 80 percent (100 percent - 20 percent). Slope is discussed at length in later paragraphs.</p> <p>The unit curve theory is expressed in the following equation:</p> $Y = AX^B$ <p>Where:</p> <ul style="list-style-type: none"> Y represents the unit cost (hours or dollars) of the xth unit; X is the unit number. A is a coefficient (constant) that represents the theoretical cost (hours or dollars) of the first unit; B is a coefficient (constant) that is related to the slope and the rate of change of the improvement curve. It is calculated from the relationship: $B = \frac{\text{logarithm of the slope}}{\text{logarithm of 2}}$ <p>In calculating B, the slope MUST be expressed in decimal form rather than percentage form.</p>
------------------------	--

(continued on next page)

Basic Improvement Curve Theories

(continued)

Cumulative
Average
Improvement
Curve

The cumulative average improvement curve is the model first introduced by Wright in 1936. The formulation is also known by two other names: Wright curve, after T.P. Wright; and Northrop curve, after one of the firms that first embraced its use.

Cumulative average theory can be stated as follows:

*As the total volume of units produced doubles, the **average** cost per unit decreases by some constant percentage.*

The constant percentage by which the costs of doubled quantities decrease is called the rate of learning. The term “slope” in the improvement curve analysis is the difference between 100 percent and the rate of learning. If the rate of learning is 20 percent, the improvement curve slope is 80 percent (100 percent - 20 percent). Slope is discussed at length in latter paragraphs.

The unit curve theory is expressed in the following equation:

$$\bar{Y} = AX^B$$

Where: \bar{Y} represents the cumulative average unit cost (hours or dollars) of units through the xth unit;

All other symbols have the same meaning used in describing the unit improvement curve.

6.8.2 Basic Improvement Curve Theories

(continued)

Curve Differences

Note that the only difference between definitions of the Unit Improvement Curve and the Cumulative average Improvement Curve theories is the word *average*. In the unit curve, unit cost is reduced by some constant percentage. In the cumulative average curve, the average cost is reduced by the same percentage.

The most significant practical difference between the two different formulations is found in the first few units of production. Over the first few units, an operation following the cumulative average curve will experience a much greater reduction in cost, hours or dollars, than an operation following a unit curve with the same slope. In later production, the reduction in cost for an operation following a cumulative average curve will be about the same as an operation following a unit curve with the same slope.

Because of the difference in early production, many feel that the unit curve should be used in situations where the firm is fully prepared for production; and the cumulative average curve should be used in situations where the firm is NOT completely ready for production. For example, the cumulative average curve should be used in situations where significant tooling or design problems may NOT be completely resolved. In such situations, the production of the first units will be particularly inefficient but improvement should be rapid as problems are resolved.

In practice, firms typically use one formulation regardless of differences in the production situation. Most firms in the airframe industry use the cumulative average curve. Most firms in other industries use the unit curve.

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

Introduction

In this course, we will only consider application of the unit curve.

Slope Illustration

To illustrate the unit curve concept, assume that the first unit required 100,000 labor hours to produce. If the slope of the curve is 80 percent slope, the following table demonstrates the labor hours required to produce units at successively doubled quantities.

UNITS PRODUCED	LABOR HOURS PER UNIT AT DOUBLED QUANTITIES	DIFFERENCE IN LABOR HOURS PER UNIT AT DOUBLED QUANTITIES	RATE OF IMPROVEMENT (%)	SLOPE OF CURVE (%)
1	100,000			
2	80,000	20,000	20	80
4	64,000	16,000	20	80
8	51,200	12,800	20	80
16	40,960	10,240	20	80
32	32,768	8,192	20	80

Obviously, the difference or amount of labor-hour reduction is not constant. Rather, it declines by a continually diminishing amount as the quantities are doubled. The rate of change or decline does remain constant.

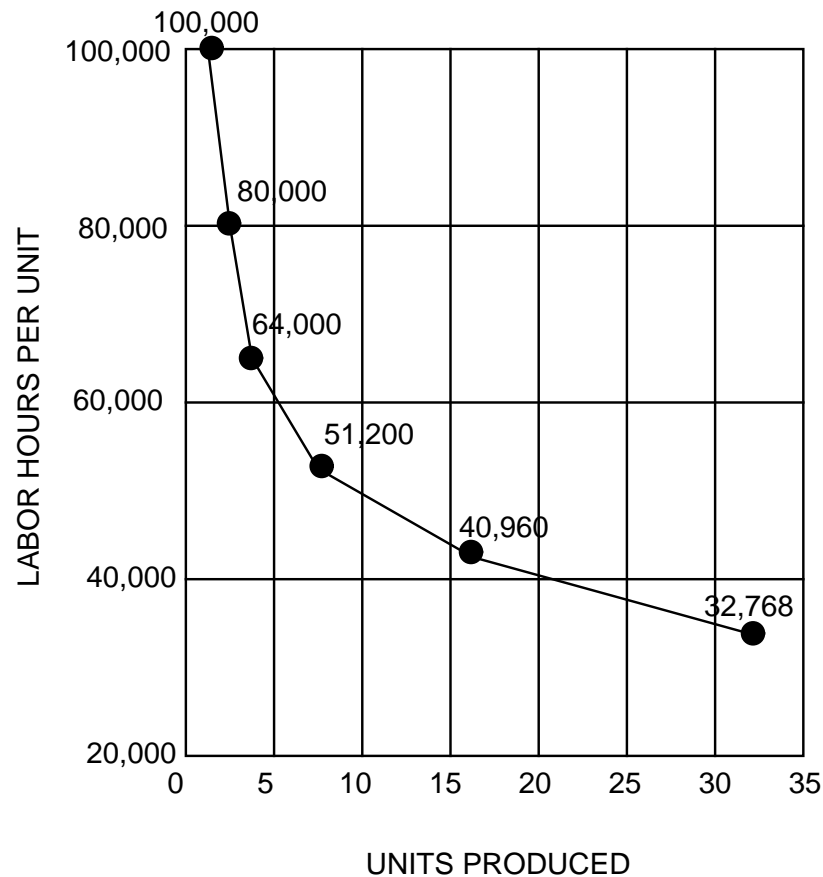
(continued on next page)

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Plotting the
Data

Rectangular Coordinate Graph. A labor-hour graph of this data curve drawn on ordinary graph paper (rectangular coordinates) becomes a curve as shown in the graph below. This graph expresses the relationship in terms where equal spaces represent equal amounts of change. When thinking of numbers in terms of their absolute values, the graphical picture presents an accurate description. But it is difficult to make an accurate prediction from this curve.



(continued on next page)

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Log-Log Paper

To examine the data and make predictions using unit improvement curve theory, we need to transform the data to logarithms. One way of making the transformation is through the use of log-log graph paper also known as full logarithmic graph paper.

There are several special elements that must be considered when using log-log graph paper.

1	There is already a scale indicated on both the horizontal and vertical axes. Note that there are no zeros. Values can approach zero but never reach it.
2	<p>The scale only goes from 1 to 10. Each time the number scale goes from 1 to 10, the paper depicts a cycle. Each 1 moving up on the vertical axis or to the right on the horizontal axis is 10 more than the 1 before it.</p> <p>In improvement curve analysis, the number of the units produced will always be graphed on the horizontal axis. As a result, the first 1 on the left of the page is always assigned the value of 1 representing the first unit produced. The second 1 is 10. The third 1 is 100. The fourth 1 is 1,000.</p> <p>The cost in hours or dollars is always graphed on the vertical axis. On the vertical axis, the scale will change depending on the data being graphed. The first 1 can be .001, .01, 1, 100, 1,000 or any other integral power of 10. Whatever the value assigned to the first 1, the next 1 is 10 times more, and the next one 10 times more than that. To determine the scale to be used:</p> <ul style="list-style-type: none"> • Estimate the largest number to be plotted or read on the Y axis. This figure will probably be the theoretical cost of the first unit. For example, suppose this is 60,000 hours. • Determine the next integral power of ten above this number. The next integral power above 60,000 is 100,000. • Assign this value to the horizontal line at the top of the upper cycle on the Y axis. The horizontal line at the top of the next lower cycle must then represent 10,000 of the same units, and the line at the bottom of the lower cycle represents 1,000. • It is advisable to mark the values to be used in the margin of the log-log paper before starting to plot points.
3	On log-log graph paper, the distances between numbers on each axis are equal for equal percentage changes. For example, the distance between 1 and 2 is the same as between 4 and 8; both represent a 100 percent increase.

(continued on next page)

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Log-Log Graph

Surprisingly accurate results can be obtained from a log-log graph of data. The accuracy of the results obtained from improvement curve graphs depends greatly on the degree of refinement of the estimator's plotting technique.

- Always use a **sharp** pencil.
- Points plotted on the paper should be as small as possible, and the lines as narrow as possible.
- When the smallest possible point has been marked on the paper, you can easily lose it or confuse it with a blemish in the paper. To avoid this, draw a small ring around the point. Circles, triangles, and squares are also used to identify points which belong to different sets of data.
- Great care should be exercised in drawing a line. If the line is supposed to go through a point, draw the line exactly through it, not merely close to it.

A graph of the data described in the example above forms a perfectly straight line when plotted on log-log paper. That is, a straight line passes exactly through each of the points. A straight line on log-log paper indicates that the rate of change is constant.

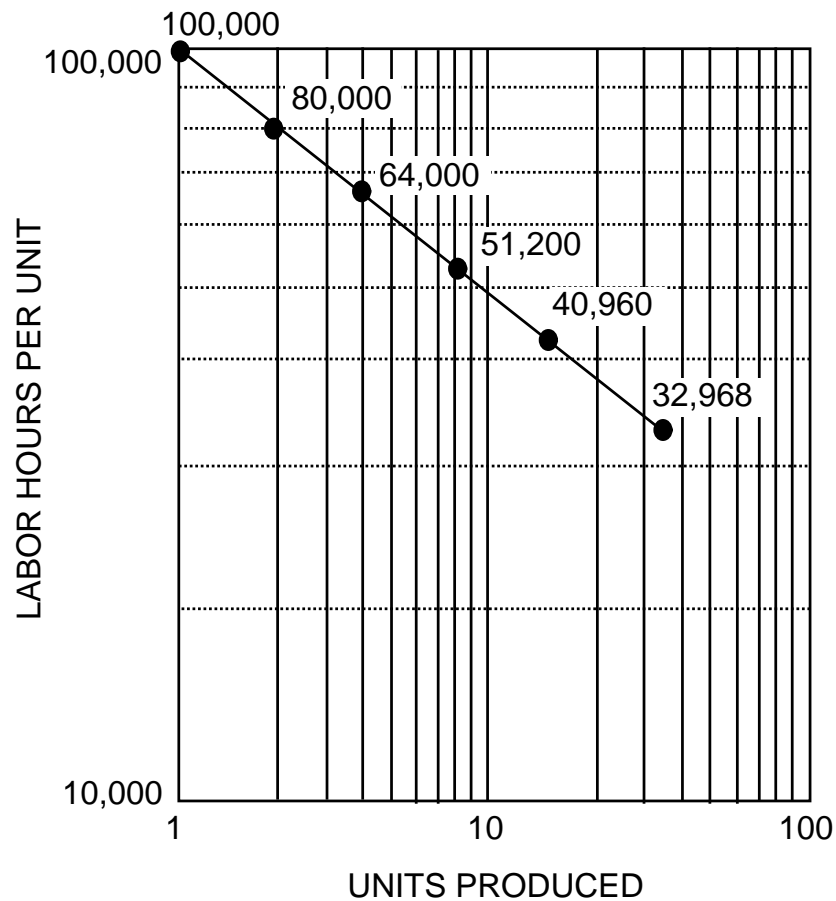
Since improvement curve theory assumes continuing improvement at a constant rate, the straight line becomes an excellent estimating tool. Assuming that improvement will continue at the same rate, the line can be extended to estimate the cost of future units.

(continued on next page)

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Log-Log Graph



Calculate the Theoretical Value of Unit #1

When improvement curves are described, they are normally described in terms of the theoretical value for Unit #1 and the slope of the curve. With these two values, we can reconstruct the curve or use tables or computer programs to estimate the cost of future units.

The Unit #1 cost can be read from the graph at the point where the improvement curve intersects with the vertical line which represents Unit #1. Remember, the graph of the improvement curve always begins with Unit #1.

The value of Unit #1 is referred to as a theoretical value, because, in most cases, we will not know the actual cost of Unit #1. A graph of known data can be extended to the left to estimate the value of Unit #1.

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Calculate the
Slope

The term “slope” as used for improvement curves is a mathematical misnomer. It cannot be related to the definition of slope in a straight line on rectangular coordinates. Instead, as we stated in the introduction to the unit improvement curve, *the **slope** of a improvement curve is equal to 100 minus that constant percentage decrease (100 - rate of improvement).*

The slope can be calculated directly by dividing the unit cost (Y_X) at some unit (X) into the unit cost (Y_{2X}) at twice the quantity ($2X$) and multiplying the resulting ratio by 100.

$$\text{Slope} = 100 \left(\frac{Y_{2X}}{Y_X} \right)$$

Therefore, we can measure the slope of an improvement curve drawn on log-log paper by reading a cost (Y_X) at any quantity, X ; reading a cost (Y_{2X}) at any quantity, $2X$; dividing the second value by the first; and multiplying by 100.

For example, if the number of hours (read from the graph) to make Unit #5 is 70 and the number of hours (read from the graph) to make Unit #10 is 50, the slope of the improvement curve is:

$$\text{Slope} = 100 \left(\frac{Y_{10}}{Y_5} \right)$$

$$\text{Slope} = 100 \left(\frac{50}{70} \right)$$

$$\text{Slope} = 71.4 \text{ percent}$$

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

Slope Research Data

The SRI study revealed that many different slopes were experienced by different manufacturers, sometimes on similar manufacturing programs. In fact, manufacturing data collected from the World War II aircraft manufacturing industry had slopes ranging from 69.7 percent to almost 100 percent. These slopes averaged 80 percent.

Research by DCAA in 1970 found curves ranging from less than 75 percent to more than 95 percent. The average slope was 85 percent.

Slope Selection and Verification

Unfortunately, information on industry average curves is frequently misapplied by practitioners who use them as a standard or norm. Because each situation is different, the *order of preference in slope selection* is:

1. A curve developed from data pertaining to the production of the same item; or the median percentage from a group of such curves.
 2. The median percentage from a group of curves for items having some similarity to the end item.
 3. The median percentage from the product category in which the item would most likely be included.
-

Estimating the Cost of Future Units

The primary purpose for developing the improvement curve as a cost/price analysis tool is to predict the cost of future production. The prediction is based on the assumption (not always true) that the future will behave as the past. In terms of the unit improvement curve theory, this assumption means that the cost (hours) of doubled quantities will continue to decrease by some constant percentage.

Prediction can most easily be accomplished by drawing a straight line through the historical observed data on log-log paper and extending that straight line through some future quantity to be produced. The predicted cost per unit to produce any particular unit is read on the Y axis horizontally at a point even with the point where the improvement line and a vertical line drawn at the specified quantity intersect.

(continued on next page)

6.8.3 Interpret Improvement Curve Using Unit Data and Unit Theory

(continued)

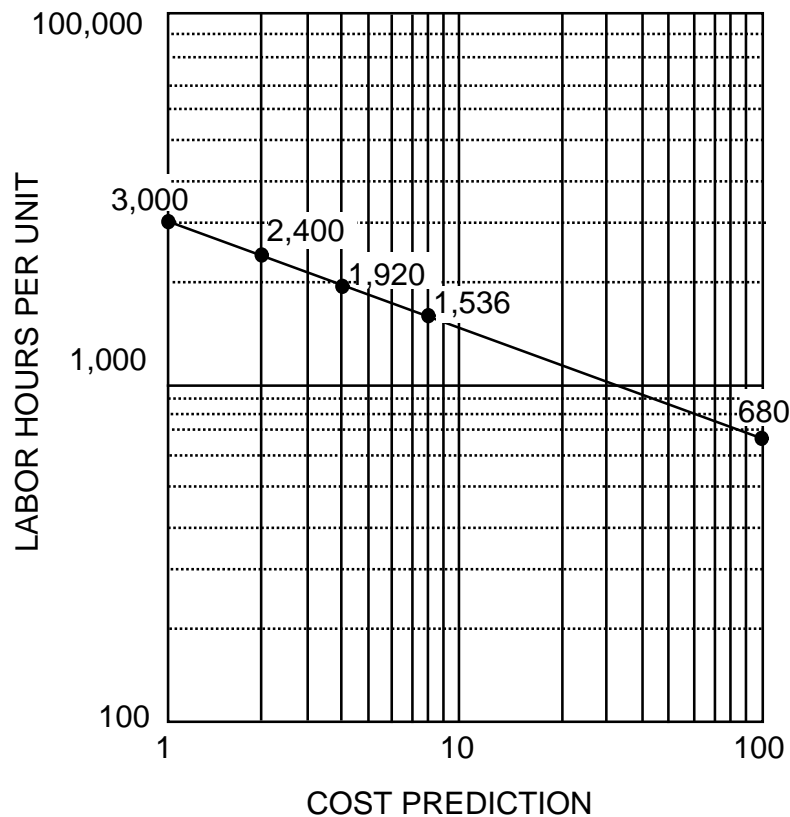
Estimating the
Cost of Future
Units

(continued)

For example, suppose we had the following unit cost data:

UNIT NUMBER	HOURS
1	3,000
2	2,400
4	1,920
8	1,536

Plotting the data on log-log paper, you will observe a straight line with an 80 percent slope.



If the line is extended to Unit #100, you can estimate the cost of Unit #100. As you can see from the graph, the extended line reveals an estimated cost of approximately 680 hours for Unit #100.

6.8.4 Interpret Improvement Curve Using Lot Data

Introduction

The use of the improvement curve is dependent on available cost data. An accounting or statistical record system must be devised by a company so that data is available for improvement curve analysis. Costs, such as labor hours per unit or dollars per unit, must be identified with the unit of product.

It is preferable to use labor hours rather than dollars, since the dollars contain an additional variable — the effect of inflation or deflation — which the labor hours do not contain.

Typically, accounting systems do not record the cost of individual units. If the firm uses a lot-release system, costs are accumulated on the job order in which the number of units completed are specified and costs are cut-off at the completion of the units. The continuous process method also yields costs identified with end-item units. In this case, however, the costs are usually equated with equivalent units produced over a period of time rather than actual units.

Average Unit Cost

To use unit improvement curve theory, we must be able to plot the cost of a particular unit. Given lot or period costs, the only unit cost that we know is the average cost.

For example, assume the following lot data:

LOT NUMBER	LOT SIZE (UNITS)	LOT TOTAL LABOR HOURS	LOT AVERAGE HOURS (COSTS)
1	6	40,800	6,800
2	9	40,500	4,500
3	15	52,500	3,500

(continued on next page)

6.8.4 Interpret Improvement Curve Using Lot Data

(continued)

Lot Plot Point

To plot the lot average unit cost, we must select a corresponding unit number. If we assume that costs go down during the lot, the average cost should occur near the middle of the lot.

In most cases, the mid-point is calculated by dividing the number of units in the lot by 2. This resulting number is then added to all the units produced prior to the lot to determine where the unit falls in continuing improvement curve.

For example, what would be the plot point for a lot made up of units 91 through 100? There are 10 units in the lot, so the middle of the lot would be 5 ($10 \div 2 = 5$). Adding 5 to the 90 units produced prior to the lot, the plot point would be 95.

Because the cost of the units in the first lot decline so rapidly, there may be some distortion when locating the representative value at the midpoint of the first lot. This holds true especially when the first lot contains 10 or more units.

This distortion is compensated for by a ***rule-of-thumb*** which states that:

- *If the FIRST LOT contains ten or more units, the lot size must be divided by 3 in calculating the first lot plot point.*
- *If the FIRST LOT contains less than 10 units, the lot size should be divided by 2 in calculating the first lot plot point.*

This rule-of-thumb applies to first lot only. It is not exact but it approximates the true lot midpoint. The true midpoint can be computed using a rather complicated procedure, but in most instances the rule-of-thumb is sufficiently accurate.

(continued on next page)

6.8.4 Interpret Improvement Curve Using Lot Data

(continued)

Lot Plot Point

(continued)

Continuing the three-lot example for 30 units of production where the lot sizes are 6, 9, and 15, lot plot points are calculated below:

LOT NO.	LOT SIZE	CUMULATIVE UNITS	LOT MID-POINT	LOT PLOT POINT
1	6	6	3.0	3.0
2	9	15	4.5	10.5
3	15	30	7.5	22.5

Unit values of lot plot points for quantities yet to be produced can also be calculated. For example, consider an additional lot of 40 units to be produced after the 30 units described above. The final row of the table would be:

4	40	70	20	50
---	----	----	----	----

The estimate for Lot 4 would be read at Unit #50.

**Combining Lot
Plot Points and
Average Unit
Cost
Calculations**

The calculations for the lot average unit cost and the lot plot point can be combined on a single table.

Continuing the example:

LOT NO.	LOT SIZE	CUMULATIVE UNITS	LOT MID-POINT	LOT PLOT POINT	LOT AVERAGE HOURS	LOT TOTAL HOURS
1	6	6	3.0	3.0	6,800	40,800
2	9	15	4.5	10.5	4,500	40,500
3	15	30	7.5	22.5	3,500	52,500
4	40	70	20.0	50.0		

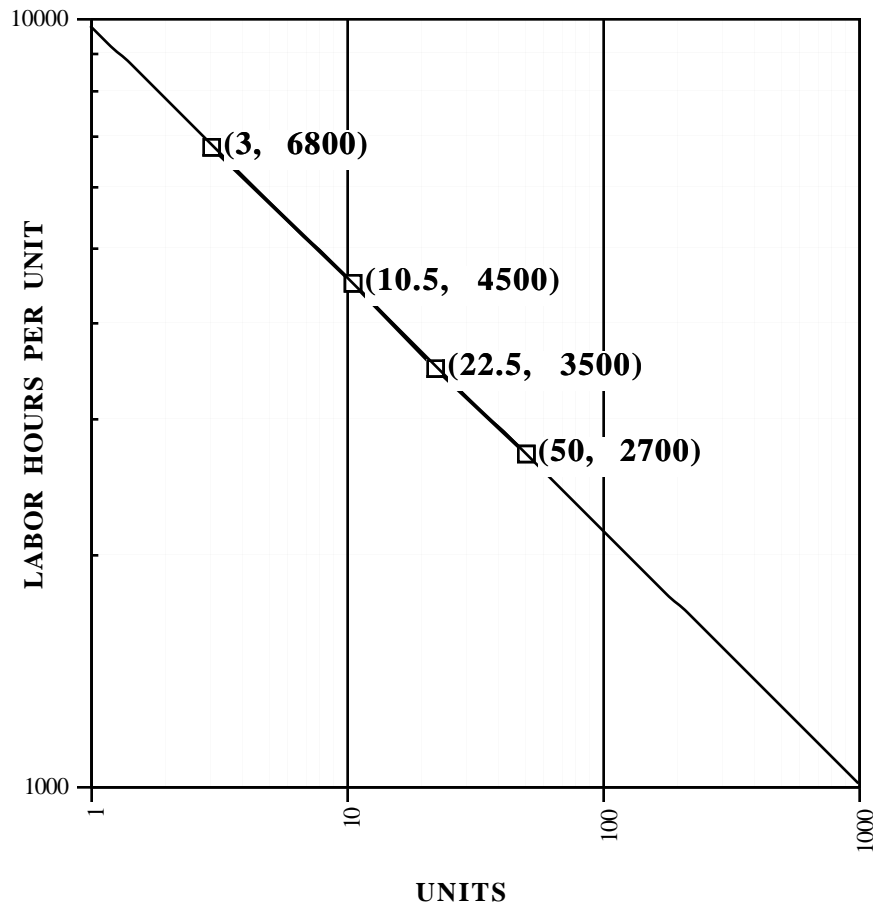
(Example continued on next page)

6.8.4 Interpret Improvement Curve Using Lot Data

(continued)

Combining Lot
Plot Points and
Average Unit
Cost
Calculations
(continued)

Plot the average lot labor hour data (Y) at the corresponding lot plot points (X) on log-log paper and fit an improvement curve. Extend the improvement curve through Unit #50, the lot plot point for Lot #4.



On the Y axis read the lot average cost of Unit #50, is approximately 2,700 labor hours. The cost for Lot #4 can then be estimated by multiplying 2,700 hours per unit by 40 units. The final estimate is 108,000 labor hours.

(continued on next page)

6.8.5 Fitting and Projecting an Improvement Curve

Fitting an Improvement Curve

As with other models discussed earlier, available data rarely follow a perfectly straight line. A line-of-best-fit can be estimated for the available data. Unfortunately, you cannot use the (\bar{X}, \bar{Y}) to aid in fitting the line.

To visually fit a straight line, you should attempt to minimize the distance between the straight line and the data points. In improvement curve analysis, more weight is usually given to larger lots in fitting the line. If one data point is a significant distance away from the best fit line, further analysis into the cause of the deviation is indicated. If this analysis indicates, adjustment or elimination of the errant data point might be in order.

Improvement Curve Tables

Once the cost of Unit #1, in hours or dollars, and the slope of the improvement curve have been established, tables can be used to predict the cost of individual units or production lots.

Tables are an expansion of the X^B portion of the basic unit improvement curve equation, $Y = AX^B$. The result is recorded as a decimal fraction, which is typically calculated to six or eight decimal places. Each unit and slope have a different value.

You simply multiply the cost of Unit #1 by the appropriate factor for the desired unit and slope to estimate the cost of that unit.

For example, if Unit #1 is 2,000 labor hours, what would be your estimate for Unit #20 if production is expected to follow an 80 percent improvement curve. The table value for Unit #20 and an 80 percent slope is .38120790.

$$.38120790 * 2,000 \text{ labor hours} = 762.4 \text{ labor hours}$$

Similar tables can be used to estimate lot costs. The factors in those tables represent the sum of all unit factors through the unit identified in the table.

Examples of improvement curve tables can be found in the DCAA Contract Audit Manual, Appendix F.

(continued on next page)

6.8.5 Fitting and Projecting an Improvement Curve

(continued)

Computer Models

Computer models also exist that can be used to estimate the cost of units based on available improvement curve information. Before using any of these models, it is important to understand how the model works. Models differ in several respects on how they perform unit curve analysis. During negotiation, you and a contractor may agree on the input data but still disagree on the results based on the use of different models.

If possible use a model that can produce a graph of the analysis. As with the use of other mathematical models, a graph can be useful in detecting analysis flaws and in explaining the results of the analysis to others.

A good example of analysis software used by the Government is DCAA's E-Z Quant. The E-Z Quant software contains a variety of options for improvement curve analysis using either the unit or cumulative average theory. For more information on E-Z Quant, see DCAAP 7641.91, E-Z Quant, Quantitative Methods for Auditors.

End-of-Chapter Vignette

Andrew is trying to relate the estimating/analysis techniques to the radio proposal.

*Review the WEC proposal and match the estimating/analysis technique(s) that might be used on this procurement to the cost elements listed. **Note:** NOT every technique may fit this particular proposal.*

ANSWER	COST ELEMENT	CHOICE	TECHNIQUE
	Manufacturing hours	A	Sampling
	Manufacturing labor rates	B	Index numbers
	Engineering hours	C	Cost-Volume-Profit
	Engineering labor rates	D	Line of best fit
	Purchased parts	E	Economic forecasts
	Overheads and G&A	F	Cost estimating relationships
	Total cost	G	Moving averages
		H	Improvement curves

Chapter Vignette

Andrew Begins His Review

FINALLY, a proposal to work on! The buyer Kay assigned to help Andrew through his first case has suggested that he start with direct material costs. The proposal includes material costs, an SF 1412, and a scrap and usage factor. Since this case was started by another buyer, there is an audit report, a technical report, and an Administrative Contracting Officer's report using several of the analytical techniques he had just studied. Andrew said to himself, "I always thought 'parts is parts,' but this is more complicated than I realized!"

Course Learning Objectives

At the end of this chapter, you will be able to establish prenegotiation positions for direct material costs, based on an analysis of the proposed:

1. Material Mix
2. Summary Estimates
3. Quantities
4. Unit Prices
5. Subcontracts

Chapter Overview

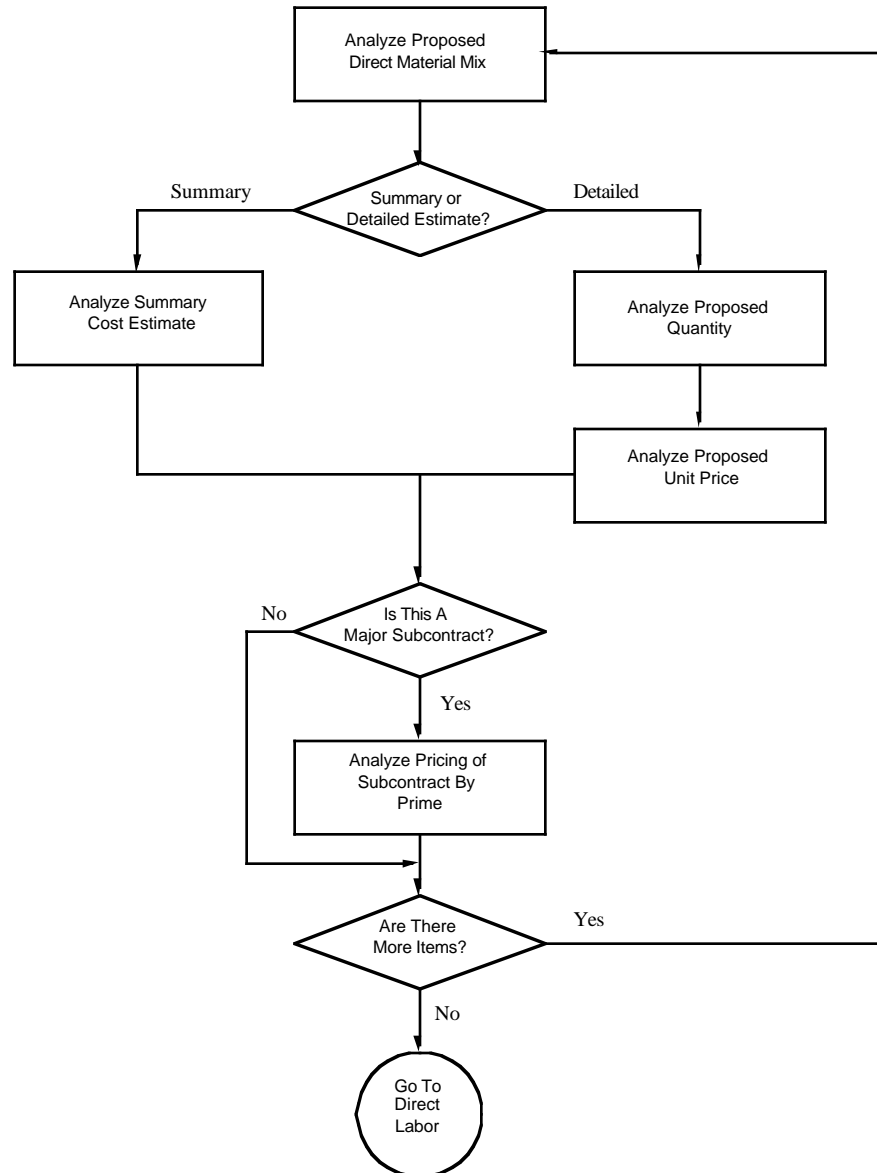
Overview Government contractors must buy the materials that go into the products they sell to the Government. Therefore, a large portion of the price of the product is the cost of the direct materials acquired through the contractor's purchasing system. In fact, direct material costs often account for more than half of the total contract cost. In this chapter, you will learn how to develop prenegotiation positions on direct material costs.

Maps in This Chapter	This chapter contains the following maps.
	7.1 PROPOSED DIRECT MATERIAL MIX 7-5
	7.1.1 Identify Direct Material Elements 7-6
	7.1.2 Identify Collateral Costs 7-8
	7.1.3 Identify Related Costs..... 7-9
	7.1.4 Analyze Proposed Direct Material Mix 7-12
	7.2 SUMMARY COST ESTIMATE..... 7-15
	7.2.1 Analyze Summary Cost Estimates..... 7-16
	7.2.2 Examples..... 7-21
	7.3 DETAILED COST ESTIMATE..... 7-23
	7.3.1 Analyze Proposed Quantities..... 7-24
	7.3.2 Analyze Proposed Unit Prices 7-29
	7.4 MAJOR SUBCONTRACT REQUIREMENTS..... 7-40
	7.4.1 Evaluate Subcontract Pricing..... 7-41

Chapter Overview

(continued)

Flowchart of
Direct Material
Costs Analysis



7.1 PROPOSED DIRECT MATERIAL MIX

Section Overview

Overview

Offerors prepare direct material cost proposals as prescribed by FAR Table 15-2 (see Chapter 2) and as part of the structured breakdown described in Chapter 5. Generally, offerors:

1. Estimate the material requirements of each work package.
2. Total the work package estimates by contract line item.
3. Total the line item estimates to arrive at an overall dollar figure for direct material costs.

Alternatively, offerors may develop summary cost estimates for some materials (see section 7.2).

As you determine how to proceed with your analysis, you **MUST** identify the types of direct material costs represented in the bottom line figure for such costs. The dollar value of materials that will become a part of the final product obviously count as direct material costs. However, there are other, less obvious costs that may be proposed as direct material costs. Sometimes, classifying a material cost as direct or indirect is a matter of judgement. In this section, you will learn to identify the types of cost that may be classified as direct material costs.

Maps in this Section

In this section are the following maps:

- Identify Direct Material Elements
 - Identify Collateral Costs
 - Identify Related Costs
 - Analyze Proposed Direct Material Mix
-

7.1.1 Identify Direct Material Elements

Types of Material Costs

FAR 31.205-26

Proposed direct material costs often include more than just the cost of the physical materials that become part of the product. Material costs may include:

- the cost of the materials bought to make the product
- collateral costs, such as freight and insurance
- related considerations, such as overruns, spoilage, defective parts

You may find that the terminology used to label these costs, as well as their accounting and estimating treatments, is slightly different for each offeror. This section describes the general practices used to identify direct material costs.

Cost of Materials

FAR 31.205-26(a)

Cost of materials, as defined in FAR 31.205-26(a), includes the costs of such items as raw materials, parts, subassemblies, components, and manufacturing supplies. Material cost proposals may include the cost of contract services. This chapter will center on the analysis of materials costs as defined in FAR 31.205-26(a). For analysis of costs related to contract services, see Chapter 8, Direct Labor Costs, and the section on Consultants and Contract Labor in Chapter 9, Other Direct Costs.

Whether material costs are treated as direct or indirect usually depends on the relationship of the materials to the end product. Normally, the dollar value of materials that become part of an end product is classified as a *direct cost* of making the product. The key is whether the need for those materials can be traced directly to the production of the product.

There are exceptions. For example, “pan/bench stock,” such as standard nuts and bolts, may be accounted for as an indirect cost, because of their low prices. However, if production material is costly, the offeror should treat it as a direct cost.

If a material item CANNOT be directly traced to the end product, the cost of that item is typically classified as *indirect*. However, if such materials are costly and used only for a limited number of products, their costs may be classified as direct. For example, if the firm uses an expensive curing agent only to make one product for you and a somewhat similar product for one other customer, the firm may elect to estimate and account for the cost of that agent as a direct cost.

7.1.1 Identify Direct Material Elements

(continued)

Accounting
for Materials

The following two tables match material types with their most common accounting treatment. Use these tables as a general guide.

Material Table

MATERIAL TYPE*	DEFINITION	SITUATION
Raw Materials	Materials that require further processing	A
Parts	Items which, when joined together with another item, are NOT normally subject to disassembly without destruction or impairment of use	B
Subassemblies	Self-contained units of an assembly that can be removed, replaced, and repaired separately	C
Components	Items which generally have the physical characteristics of relatively simple hardware items and which are listed in the specifications for an assembly, subassembly, or end item	B,C
Manufacturing Supplies	Items of supply that are required by a manufacturing process or in support of manufacturing activities	D
* The material types in this table are drawn from FAR 31.205-26(a), Material Costs. The terms reflect a manufacturing orientation. In analyzing material costs proposed for services or construction, compare the proposed use of the materials with the definitions in this table for the most appropriate accounting treatment. Also, consider the general guidance offered on the previous page.		

Cost Identification
Table

SITUATION	DESCRIPTION OF PURCHASE AND ACCOUNT HANDLING	DIRECT/ INDIRECT COST
A	Bought in bulk against overall requirements. Charged out to cost objective at inventory value.	Mostly direct with some indirect
B	Bought against specific requirements and anticipated requirements. Kept in a common inventory and charged out to cost objectives at inventory value.	Normally direct
C	Bought against specific requirements and identified with end products.	Normally direct
D	Bought to meet overall needs such as pan/bench stock, manufacturing supplies, process material, maintenance materials.	Mostly indirect with some direct

7.1.2 Identify Collateral Costs

Introduction <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR 31.205-6</div>	Identify the collateral costs that may be charged as direct material costs. Collateral costs are expenses associated with getting materials into the offeror's plant. Inbound transportation and intransit insurance are two examples of the types of collateral costs often classified as direct material.
---	---

Inbound Transportation <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR 31.205-45</div>	Inbound transportation or freight-in expenses are a recognized cost of doing business under FAR 31.205-45. These costs can, under differing circumstances, be charged either as part of the direct cost of the material or included in overhead. The local Government auditor will be able to assist you in determining whether the proposal correctly recognizes transportation costs consistent with the contractor's accounting practices.
---	---

Intransit Insurance <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR 31.205-19 & 31.205-45</div>	Intransit insurance expenses are recognizable as long as they are reasonable, and meet the general guidance for insurance expense (FAR 31.205-19) and transportation costs (FAR 31.205-45). As with freight-in costs, this cost, under differing circumstances, can be charged either as part of the direct material cost or included in overhead. The contractor's accounting practices should describe when the cost will be added to the cost of material, and when the cost will be charged to an appropriate overhead account. The proposal should be consistent with the accounting treatment.
--	--

7.1.3 Identify Related Costs

Introduction

Identify estimates of excess materials that the offeror proposed to purchase to assure that sufficient material is available for production of the item. Estimates may include costs related to material overruns, scrap, spoilage, and defective parts.

Some offerors will develop a single estimate which encompasses all of these costs. When a single estimate is used, it is typically referred to as scrap.

Other offerors will develop separate estimates for several of the different types of cost. When separate estimates are developed, you **MUST** assure that the same costs do **NOT** appear in different estimates.

Costs are normally estimated using cost estimating relationships. The proposal and related documentation **MUST** provide adequate analysis and statistical data to identify and support any costs included in the proposal. (Methods for analyzing such estimates will be covered later in the chapter.)

The material described in this section represents estimates of excess materials that the offeror proposes to purchase to assure that sufficient material is available *for the production of the item being contracted*. Even though an item is classified as scrap or spoilage, it may still have value in the production of other products or as material that can be sold for reclamation or reprocessing. That value must also be considered either as a credit to the direct cost of the proposal or as a credit to an appropriate overhead account.

Overruns

Simply stated, overruns result from an estimate, purchase, or production of more units than are required by the job. A common example is minimum order quantities. An assembly requires 25 each of a special fastener, that can only be bought in quantities of 100. If the fastener can only be used on the one job, you may have to pay for all 100 under your contract. On the other hand, if the fastener has general application, you should expect to pay only for the ones used on your contract.

(continued on next page)

7.1.3 Identify Related Costs

(continued)

Scrap

Scrap is no longer usable for the purpose for which it was originally intended.

For example: (1) A casting may require machining prior to incorporation into an assembly. The material removed during the machining process is scrap. (2) A sheet of metal may have a variety of shapes cut from it. The leftover pieces that are too small to cut into the required shapes are scrap.

Spoilage

There are many kinds of spoilage. Some of the more common types of spoilage are:

Shelf-life. Shelf-life is the length of time some materials retain their usable properties while waiting to be used, after that time they must be discarded. For example, industrial silicon rubber compounds are used as coatings or adhesives in many manufacturing processes. If these compounds are not used within a certain time period—their shelf-life, they lose their usable properties and have to be discarded.

Losses. Material losses are normally discovered during inventories. Lost materials may have been stolen, inadvertently discarded, or misplaced. In any event, the material records show materials that are no longer available and the material **MUST** be removed from the records or “written off.”

Obsolescence. This can occur anytime there is a large inventory that will meet manufacturing needs for a long period. Materials become obsolete due to design changes that require new parts or materials, thus rendering the old inventory useless.

7.1.3 Identify Related Costs

(continued)

Defective Parts

Defective parts are items that fail to meet inspection specifications. Depending on the severity of the defect, such parts can be scrapped, reworked, or “used as is.” Defective parts are also known as “yield.” Whether a defective part is usable as is, reworkable, or just scrap, there are costs associated with the action that **MUST** be considered in a cost analysis.

Scrap. If the defective part cannot be used for its intended purpose or made usable, it will usually be charged as scrap.

Rework. This is the process of taking the defective part and working on it again to correct the identified deficiencies. If, after rework, the item meets specifications, the part can be accepted. If the reworked item fails inspection again, then it may be either reworked again or scrapped.

Rework cost is normally seen in labor expense. However, rework does help reduce scrap costs. Depending on the offeror's accounting system, the material used during rework can be accounted for separate from normal scrap.

Use as is. This means that, while the part does NOT meet all specifications, the defect does NOT affect the part's ability to perform its intended function.

After a part has been properly examined and approved for use by the offeror's quality system, a “use as is” part can be incorporated into the end product. The costs associated with making the “use as is” decision are normally quality assurance labor and overhead. The value of the part is NOT affected unless a specific cost reduction is negotiated with the offeror.

7.1.4 Analyze Proposed Direct Material Mix

Introduction

Once you have identified all direct material costs in the proposal, ensure that the offeror plans to use the most economical and efficient mix of materials to satisfy the Government's requirements. If an element of proposed material cost appears suspicious, concentrate more effort on analysis of that element than on less suspicious elements of similar dollar value. Then, as you perform your analysis of the detailed support, follow the same general steps in your analysis.

Analysis Steps

STEP	ANALYSIS
1	<p>Determine whether the units of material proposed are necessary for the work.</p> <ul style="list-style-type: none"> Is the item necessary? Excessive quantities and items NOT listed on the drawings or specifications can find their way into a proposal. Should the item be purchased, NOT made (or vice versa)? An item may be proposed as a “make” when it is available at a lower price as a “buy” item or vice versa. Offerors may be concerned about issues other than the lowest cost to the Government. Can a less expensive item be substituted, in whole or in part? Sometimes, the part may be over specified (i.e. excessively tight tolerances). A commercial part might be available to replace a part made to Government specifications. Consider using value engineering techniques to identify less expensive parts. Is the value added by the item commensurate with its cost? Ultimately, you MUST get good value to ensure that tax dollars are prudently spent. You may find cases where to get a marginal improvement an extraordinary cost is incurred (i.e. Gold Plating the product) Is the item acceptable under terms and conditions of the contract? If the contract requires new materials, or material certifications in accordance with specifications or standards, then the proposed materials MUST meet these requirements.

7.1.4 Analyze Proposed Direct Material Mix

(continued)

Analysis Steps

(continued)

STEP	ANALYSIS
2	<p>Determine whether any of the proposed direct material costs belong in an indirect cost pool.</p> <ul style="list-style-type: none"> Has the offeror consistently treated the material as a direct cost? If it has NOT been treated consistently, there is a good chance that you may pay for it twice; once as a direct cost and a second time through overhead! If in doubt, check with the responsible Government auditor. Is the material cost proposed and accounted for in a manner consistent with the contractor's disclosure statement and documented accounting practices? If the answer is "yes," the accounting treatment is probably acceptable. If there is any question, check with the responsible Government auditor.
3	<p>Determine if the costs proposed are realistic for units of material required.</p> <ul style="list-style-type: none"> Has the contractor accounted for all probable direct material costs associated with the units of material proposed? If the contractor has NOT accounted for all reasonable material costs, you run the risk of several potential problems: cost overruns; failure to complete the contract due to financial problems; and potential claims of defective specifications, to name a few.
4	<p>If there are concerns, document and consider them in development of your prenegotiation positions.</p> <ul style="list-style-type: none"> Has the offeror had an opportunity to answer your concerns? Consider raising these concerns in fact-finding conversations with the offeror. If the problem is an error in the proposal, bring the error to the offeror's attention so that it can be corrected prior to negotiations. Does your documentation provide a clear audit trail for later review? Specifically identify documents and sources used in analyzing the proposal, to provide an audit trail for review. If any data turns out to be defective, the degree to which you relied on it will be clearly evident, making recovery of over payments easier.

7.1.4 Analyze Proposed Direct Material Mix

(continued)

Summary or
Detailed Cost
Estimate

After establishing your position on the direct material mix, you are ready to tackle the offeror's estimate of the *dollar value* for materials. This estimate may take one of three forms:

1. a summary estimate for part or all of the direct material mix
2. a detailed estimate for one or more items, with figures for both the quantity required and unit price of each such item
3. a combination of detailed estimates for some items and a summary estimate(s) for other items

In general, your analysis will follow the methodology used by the offeror in proposal development. However, you should always utilize any information obtained in analysis. If you can develop a detailed estimate, do so — even if the offeror developed a proposal using a summary-level estimate. If a summary-level analysis raises doubts about a detailed proposal, use that information in questioning the detailed estimate.

Summary cost estimates will be covered next in this chapter, then detailed quantity estimates.

7.2 SUMMARY COST ESTIMATES

Section Overview

Overview	<p>“Summary estimating” means estimating total material costs absent knowledge of quantity requirements and per unit prices. Summary estimates may be made by using “round-table” or comparison techniques. Round-table estimates are commonly referred to as “engineering estimates” or estimates based on “professional judgement.” Comparison estimates involve the use of some form of comparison based on data from efforts completed or in progress.</p>
----------	--

This section describes two methods for analyzing summary estimates:

1. Analyze summary estimates as a factor of some other parameter
2. Analyze summary estimates by comparing the proposed contract effort to a similar past effort

Maps in This Section	<p>This section contains the following map:</p> <ul style="list-style-type: none">• Analyze Summary Cost Estimates• Examples
----------------------	---

7.2.1 Analyze Summary Cost Estimates

Steps In Analysis

STEP	ACTION
1	<p>Determine whether summary cost estimates are appropriate.</p> <ul style="list-style-type: none"> <i>Does the item cost warrant the expense of a detailed estimate?</i> <p>The time and effort put into an analysis needs to be commensurate with the value of the item. Summary estimates should be used when the cost of the item does NOT warrant the expense of a detailed estimate.</p> <ul style="list-style-type: none"> <i>Does the cost accounting data provide a clear history?</i> <p>If detailed cost accounting data does NOT provide a clear history, then summary-level techniques may be the most viable alternative.</p> <ul style="list-style-type: none"> <i>Would the summary-level analysis be as accurate as a detailed analysis?</i> <p>If the summary-level analysis is as good as a detailed analysis, then it is more cost effective to use the less costly summary-level analysis.</p>
2	<p>Determine which summary estimating technique(s) was used in proposal development.</p> <ul style="list-style-type: none"> <i>Has the offeror estimated direct material cost using a cost estimating relationship (CER)?</i> <p>As you learned in Chapter 6, estimators use a CER to estimate costs by using an established relationship with an independent variable. The independent variable may be a parameter of the item or service being acquired (i.e. size or speed), or another contract cost (i.e., direct labor cost or direct engineering labor cost).</p> <ul style="list-style-type: none"> <i>Has the offeror estimated direct material cost using a direct comparison with the cost of a similar contract effort?</i> <p>A direct comparison is just that, a comparison with the cost of a similar contract effort. The similar effort could be the last contract for the same product or a contract for a similar product. The assumption is that, if the new effort is sufficiently similar to the historical effort, the cost of the new effort will also be similar to the historical effort. If this assumption is valid, the estimator can use the historical cost to estimate the cost of the new effort, with adjustments for factors such as the changing value of the dollar, improvement, and effort complexity.</p>

7.2.1 Analyze Summary Cost Estimates

(continued)

Steps In Analysis

(continued)

STEP	ACTION
3	<p>Determine if cost estimating relationships (CERs) used in the proposal have been properly developed and applied.</p> <p>In order to establish a valid CER, the developer MUST establish the existence of a relationship between the cost and the parameter and quantify the nature of the relationship. In determining if a particular CER is appropriate for estimating direct material cost, ask ten basic questions:</p> <ul style="list-style-type: none"> <li>• <i>Is there a clear and casual relationship between the estimating parameter and the cost being estimated?</i> <li>• <i>Does the mathematical analysis of available historical data support the validity of the CER?</i> <li>• <i>Does data analysis consider the changing value of the dollar?</i> <li>• <i>Does analysis of the data identify any trends in the relationship between cost and estimating parameter?</i> <li>• <i>Are historical data drawn from similar situations?</i> <li>• <i>Does the offeror consistently use the same factors in similar estimating situations for both commercial and Government business?</i> <li>• <i>Have estimates developed using the same rationale produced accurate results in other contracts?</i> <li>• <i>Have estimates developed using the same rationale produced accurate results in other contracts?</i> <li>• <i>Are there any differences in the composition of the direct material requirements being estimated and the historical data used to develop the CER? (e.g., are any materials included in CER development now estimated using a detailed estimate)</i> <li>• <i>Is the CER used the best one for estimating the cost of the proposed contract, or would some other CER produce more reliable and valid results?</i>

7.2.1 Analyze Summary Cost Estimates

(continued)

Steps In Analysis

(continued)

STEP	ACTION
4	<p>Determine if direct comparisons were properly developed and applied.</p> <p>In using direct cost comparisons, the two efforts do not have to be identical, but they must be similar enough to make valid comparisons. The estimator MUST establish the similarity of the two efforts. At the same time, the estimator must clearly define any differences that may require adjustments to historical costs. The two most common adjustments are made to consider improvement and differences in effort complexity.</p> <p>Improvement Curve. Improvement is often estimated through use of the improvement curve. The improvement curve is applied in material cost estimating exactly the same as it is in estimating direct labor hours (see Chapter 6). Historical facts must support the slope and first unit value (Unit #1). Realistic estimates can be made if historical costs are normal costs that had not been affected by extraordinary conditions, and if the slope of the curve is reasonable for the product and production methods.</p> <p>To determine the normality of the historical cost used as a base, review historical information for trends or changes in: scrap, spoilage, obsolescence, methods, tooling, make-or-buy decisions, and reductions in material cost after contract negotiation. All costs should be adjusted to consider the effects of the changing value of the dollar.</p> <p>Material improvement curves commonly range between 90 and 100 percent. In establishing the appropriate slope of the curve, you should consider the history of the same effort in the past and other similar efforts. Since you are dealing with total dollars, the slope of the curve should consider both reductions in the amount of material required and reductions in material unit costs. If major subcontracts can be identified, they should be separated from other types of material for detailed analysis.</p> <p>Common material items may show little improvement because, even though only a few have been required for your contract, thousands or hundreds of thousands of units may have been produced. If subcontract costs are analyzed using the improvement curve, you should expect a steeper improvement curve for subcontracted materials that are only used on a single contract effort.</p>

7.2.1 Analyze Summary Cost Estimates

(continued)

Steps In Analysis

(continued)

STEP	ACTION
<p>4 (continued)</p>	<p>Complexity Factor. A complexity factor is an adjustment to historical costs to consider differences between the historical effort and the effort being proposed.</p> <p>Complexity factors are typically based on professional judgement. As a result, they are difficult to analyze. The historical effort may seem simple now, but at the time it may have been extremely complex. Analysis of such estimates will require technical support from Government experts. However, your ability to negotiate a reasonable price will depend on your understanding of the complexities involved and the true need for an adjustment.</p> <p>Issues. In determining if use of a direct comparison estimate is appropriate, ask seven basic questions:</p> <ul style="list-style-type: none"> • <i>Is the basic nature of the new effort similar enough to the historical effort to make a valid comparison?</i> • <i>Does data analysis consider the changing value of the dollar?</i> • <i>Were there significant cost problems or inefficiencies in the historical effort that would distort the estimate on the new effort?</i> • <i>Have there been significant changes in technology or methods that would distort the estimate on the new effort?</i> • <i>If the historical costs have been adjusted in any way, are the adjustments reasonable?</i> • <i>Are there any significant differences in the material mix between the two efforts?</i> • <i>Did the offeror assume any improvement from historical effort to the current effort? If not, why not? If so, does the estimate properly consider improvement curve theory?</i>

7.2.1 Analyze Summary Cost Estimates

(continued)

Steps In Analysis

(continued)

STEP	ACTION
5	<p>Develop and document your prenegotiation positions.</p> <p>If you accept the offeror's summary estimate, document that acceptance. If you do not accept the summary estimate, document your concerns with the estimate and develop your own prenegotiation position for costs covered by the estimate.</p> <p>If you can identify information that would permit you to perform a more detailed analysis of material costs, use the available information. Your analysis is not bound by the estimating methods used by the offeror.</p>

7.2.2 Examples

CER-Based Summary Estimate

CER Example. CERs are often used to develop summary estimates of material costs for research and study contracts. Since the purpose of such contracts is to study something, there is often no bill of materials. However, by using the historical costs of past research projects, a “material pricing factor” can be developed.

EXAMPLES OF RESEARCH MATERIAL FACTOR DEVELOPMENT		
Research Historical Material Costs	Historical Research Labor Costs	Research Material Pricing Factor
\$4,000,000	\$8,000,000	\$0.50 per direct labor dollar
\$4,000,000	123,077 direct labor hours	\$32.50 per direct labor hour

In this example, either direct labor costs or direct labor hours could be used as the CER for estimating R&D material costs.

CER # 1: R&D Material Costs = \$0.50 * Proposed Direct Labor Dollars

CER # 2: R&D Material Costs = \$32.50 * Proposed Direct Labor Hours

Both CERs assume that, as more engineering hours are worked on the project, more material will be required. CER #1 further assumes that, the more expensive the engineer, the higher the material cost. CER #2 assumes that the level (price) of the engineer does not affect material cost.

Which of the 10 questions from Step 3 (page 7-17) would you ask about these proposed CERs?

(continued on next page)

7.2.2 Examples

(continued)

Direct
Comparison
Summary
Estimate

Direct Comparison Example. Direct comparisons are often used to estimate material cost for development of a system similar to a system developed in the past. Since no two projects are identical, some judgmental adjustments may be necessary. For example, the proposed project may be twice as complex as the historical project. The offeror may present the historical material cost of the prior project, contend that the new effort is twice as complex, and therefore multiply the historical material cost by a complexity factor of 2.00:

Historical Project Cost	\$2,050,000
Complexity Factor	<u>* 2.00</u>
Proposed Project Cost	\$4,100,000

A factor of 2.0 is rather hefty. In this example, the offeror provided no other support for the factor. Complexity factors should not be considered unless adequate support is provided.

Assuming that the offeror provides further support, which of the seven questions from Step 4 (Page 7-19) about direct comparison summary estimates would you investigate with respect to the proposed complexity factor?

7.3 DETAILED COST ESTIMATES

Section Overview

Overview	<p>This section covers the second way to estimate the proposed cost of a project, by developing a detailed cost estimate.</p> <p>Developing and analyzing a detailed cost position is much more complex and costly to do than a summary level position. However, when properly completed, the accuracy of the estimate should compensate for the additional cost. In this section, you will cover:</p> <ol style="list-style-type: none">1. how to determine the quantity of materials necessary for the project2. how to analyze the cost per unit of these materials
Maps in This Section	<p>In this section are the following maps:</p> <ul style="list-style-type: none">• Analyze Proposed Quantities• Analyze Proposed Unit Prices

7.3.1 Analyze Proposed Quantities

Introduction

Once a product has been defined through the use of detailed specifications and drawings, the offeror can prepare detailed estimates of material cost. The offeror will use a priced bill of material to estimate the cost of the direct material necessary to produce the product. The proposal **MUST** identify and support any estimate for additional material to compensate for material overruns, scrap, spoilage, and defective parts.

Bill of Material Analysis

A bill of material is a listing of all the materials, including the part numbers and quantities of all the parts, necessary for the project. When the project is complicated, there may be several bills of material for different aspects of the project. In that case, request a consolidated bill of material. By providing a consolidated bill of material and cross-references to the individual parts lists, the offeror will meet the intent of the SF 1411 instructions and make the Government review much easier.

The consolidated Bill of Material (BOM) is based on the material lists associated with the engineering drawings that define the elements of the proposed product. The individual drawing parts/material list reflects the exact items and quantities required by the drawing. The consolidated BOM items and quantities should track back to the supporting drawings. Other sources of information include specifications, the project engineer, and physically examinations of the article.

See the next page for a table showing the steps in analyzing the bill of material.

(continued on next page)

7.3.1 Analyze Proposed Quantities

(continued)

Reviewing a Bill
of Materials

STEP	ACTION
1	<p>Review the bill of material against any special concerns identified during your initial review of the material mix.</p> <p>In section 7.1.4, you analyzed the proposed material mix. If this analysis suggested changes in the material mix, base your prenegotiation position on the bill of materials as it should read rather than as submitted by the offeror.</p>
2	<p>Select a sampling strategy.</p> <p>If the proposal includes only a few material items, you may have time to review all items on the bill of material. For larger proposals with more items, you may limit your review to a sample of the items (see Chapter 6).</p> <p>If you decide to sample the items, use the sample results to adjust the total proposed cost of the entire bill of material (or of the stratum, if your strategy is stratified sampling). Suppose, for example, the offeror has proposed a total cost of \$400,000 for the 500 material line items that cost \$1,000 or less. You draw a random sample of 50 items. You determine that sampled items are overpriced by 5%. Based on this finding, establish a prenegotiation position of \$380,000 for all items — a reduction of 5% from the offeror's proposed total. The reduction is commonly called a decrement, and the 5% a decrement factor.</p> <p>Whether you look at all items or only a sample, you must develop a "should pay" position on each item selected for analysis. Base your position on an analysis of both the proposed quantity and the proposed unit price (steps 3 - 6).</p>
3	<p>Determine the validity of the base estimate of quantity.</p> <p>The base quantity estimate is the quantity of material that will actually be used in product. Technical personnel should be able to verify this quantity by comparison with relevant product drawings and specifications.</p>
4	<p>Determine the validity of any adjustments to the base estimate of quantity.</p> <p>The actual direct material required to produce a product will likely exceed the material that will be included in the product. The difference will be scrap, spoilage, and defective parts which are considered in the next section.</p>
5	<p>Document any concerns about proposed quantities, address them during fact-finding, and develop your prenegotiation positions on quantities required.</p>
6	<p>Analyze the proposed unit price (as described in section 7.3.2).</p>

7.3.1 Analyze Proposed Quantities

(continued)

This is an example of a priced consolidated bill of materials to produce 500 units of a product.

PART NUMBER	NOMENCLATURE	QUANTITY PER ASSEMBLY	SCRAP FACTOR (%)	TOTAL QUANTITY	UNIT PRICE (\$)	TOTAL PRICE (\$)
9876543	Housing casting. (Vendor: Pic Corp. PO 351522, issued 12/20 on competitive bid)	1	4	520 ea.	84.72	44,054.40
9876542	Bearing. (Vendor: Sun Co. PO 351480, issued 12/5 sole-source. Cost analysis on file).	2	12	1120 ea.	14.87	16,654.40
9876541	Gear, 14 tooth. (Vendor: Autoco. Lowest Bidder)	4	8	2160 ea.	4.18	9,028.80
9876540	Cable Assembly (Vendor: Rockway Corp. sole-source)	1	4	520 ea.	328.00	170,560.00
9876539	Bracket, main. (Vendor: Cee Cee Corp. Bracket is same as that used on earlier model. Prior price was \$22.19 ea. (PO 341110) 8% added in making estimate, two years since last buy)	3	1	1515 ea.	23.97	36,314.55
9876538	Race assembly. (Similar item bought 5/25 from Hup, Inc. for \$150 ea. Engineering estimates that it will take 1/3 more to make)	1	2	510 ea.	200.00	120,000.00
9876537	Solenoid. (Engineering estimates)	1	3	515 ea.	90.00	46,350.00
9876536	Gear, drive	1	3	515 ea.	24.00	12,360.00
	TOTAL MATERIAL					437,322.15

7.3.1 Analyze Proposed Quantities

(continued)

Scrap Rate Estimation and Analysis

In this section, scrap, spoilage, and defective parts are considered under the general title of scrap. All these costs are typically estimated using cost estimating relationships of the itemized material required to produce the product. You should normally expect to have some scrap. Your analysis should center on assuring that the estimate is reasonable.

In the Bill of Material example on page 27, examine the estimate for Part Number 9876543. A total of 104 parts must be purchased to complete assemblies requiring 100 parts. The additional four parts are estimated to be scrap.

Scrap factors are normally based on accounting data and statistical analysis or other relevant experience. The most common method of calculation is a form of moving average (See Chapter 6). Commonly, these moving averages incorporate 6 to 12 months of data.

Rates may be calculated using either dollars or units of material and are commonly calculated in one of the following ways:

$$\frac{\text{Scrap Dollars}}{\text{Total Assembly Material Dollars}} \quad \text{or} \quad \frac{\text{Scrap Units}}{\text{Total Assembly Material Units}}$$

$$\frac{\text{Scrap Dollars}}{\text{Material Dollars Purchased}} \quad \text{or} \quad \frac{\text{Scrap Units}}{\text{Material Units Purchased}}$$

(continued on next page)

7.3.1 Analyze Proposed Quantities

(continued)

Scrap Rate
Estimation and
Analysis
(continued)

When you check the scrap and rework estimates, follow these steps:

STEP	ACTION
1	Assure the rate of application is consistent with rate calculation.
2	Check the supporting analysis to ensure the additional material amounts are consistent with past experience.
3	<p>Determine if the materials, tolerances, and processes are similar to those used to calculate the scrap rate. (Note that different items in the consolidated bill of material have different scrap rates.)</p> <p>Consider: Some materials tend to produce more scrap than others in similar processes. Tighter tolerances tend to produce more scrap. Different processes produce different rates of scrap.</p>
4	<p>If possible, obtain the data used to calculate the scrap factor to see if scrap rates are changing over time.</p> <p>Consider: Experience with the same material and processes should reduce scrap Moving averages smooth variations in the data. A longer moving average, such as 12 months, places less reliance on the most recent data than a shorter 6-month moving average.</p>
5	<p>Check the amount of scrap and rework from should-cost viewpoint.</p> <p>Consider: Is the amount of scrap excessive? Is there a process improvement that would reduce this cost? Would a different type, size, or shape of material reduce scrap? What is the offeror doing to reduce scrap?</p>
6	<p>Understand what types of costs are included in the factor.</p> <p>Consider: Is it scrap only? Are other costs included?</p>
7	<p>Determine if the value of the scrap has been considered; scrap is usually NOT worthless.</p> <p>Consider: Has the scrap value been credited to overhead? Has the scrap value been credited directly to the contract?</p>

7.3.2 Analyze Proposed Unit Prices

Introduction

After you have established the quantity of each material item in the sample being analyzed, you need to analyze the unit price estimates provided by the offeror.

There are three basic ways direct material unit prices are proposed:

1. current price quotes for this proposal
2. historical quotes or purchase histories for the same items
3. inventory value pricing

Each of these approaches is acceptable *under the proper circumstances*.

Circumstances for Using Each Estimating Method

This table shows the proper circumstances for employing each unit price estimating method.

USE THIS ESTIMATING METHOD:	UNDER THESE CONDITIONS:
Current Quotes	Work will be performed in the future using materials NOT currently in inventory
	Material prices may vary significantly from current inventory values
	Sufficient lead time to acquire materials being quoted
	Sufficient proposal preparation time for the offeror to solicit and receive vendor quotes
Historical Quotes or Purchase Prices	Work will be performed in the future using materials NOT currently in inventory
	Future material prices are relatively stable or predictable
	Sufficient lead time to acquire materials being quoted
	Insufficient proposal preparation time for offeror to solicit and receive vendor quotes
Inventory Pricing	Work will be performed by using materials in the existing inventory

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing
Current
Quotes

Consider these key points when analyzing current quotes:

- ***Ensure quotes are for quantities required.***

Make sure the vendor quotations match the quantities necessary for the proposed work. For example, if 1,000 units of a part are needed, the quote should be based on 1,000 units. If the offeror is proposing to make five purchases of 200 units, the units are likely to be overpriced; larger quantity purchases usually mean lower unit prices.

Exceptions. There are two exceptions to this rule.

1. If the items being quoted are common parts, quantities for all parts required during the time period should be combined in order to obtain the best possible prices through quantity purchasing—and pass the savings on to the Government.
2. If the quoted product has a short shelf life and the contractor would not be able to use all of the material prior to the product's expiration date, then the contractor may be able to justify buying the product in several lots at different times in the production process.

- ***Consider possible negotiated price reductions.***

If the offeror has a history of negotiating reductions in the vendor's proposed price, the proposed material price should reflect the historical proposal reduction, or decrement. Even in the case of multiple vendors submitting “competitive quotes,” be on the lookout for purchase orders placed at prices less than the quote. Most contractors will try to negotiate reductions even with competitive quotes.

Techniques the offeror may employ to reduce quoted prices include: asking vendors for another round of best and final offers; continuing negotiations; switching to a lower priced vendor; and increasing order quantities to gain quantity discounts.

Reductions of material prices from the prices quoted are commonly considered through use of a decrement factor. If history shows that the offeror commonly negotiates prices 5 percent below the prices subcontractors propose, a 5 percent decrement factor can be used to consider the anticipated reduction.

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing
Current
Quotes
(continued)

- ***Consider the terms and conditions of the purchase.***

Sometimes, special conditions in the business arrangements between the offeror and vendor result in savings to the offeror. These savings should be passed on to the Government.

Some examples of special conditions are:

Quotations with escalation already included. Sometimes the offeror will ask a vendor to quote prices for orders placed over an extended period of time. The vendor will most likely include some escalation in the price for cost increases. While this is acceptable, it would be unacceptable for the offeror to add an additional escalation factor on top of a vendor quote that already includes escalation for the same period of time.

Quantity discount rebates. Occasionally, you may see an arrangement where the vendor will charge a set price on each individual order and at the end of the year offer a rebate based on the total quantity purchased. If the Government pays the individual order price, the contractor would realize excessive profits through the rebate. The offeror should project the estimated quantity for the year and discount the current quote to a price considering the estimated amount of rebate.

Priced options. While the offeror may propose a current quote, there may be an existing order with a priced option for additional quantities at a price lower than the current quote. The price the offeror really expects to pay the vendor is the lower priced option price, and that is the price that should be used.

- ***Consider timing of subcontract negotiations.***

It is usually better to reach an agreement on price with the prime before the prime has negotiated a price with subcontractors. It will likely be harder to negotiate price reductions after the offeror has agreed to a subcontract price. However, if the subcontract has been negotiated, do not accept a subcontract cost that you believe is unreasonable just because the price has been negotiated.

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing
Current
Quotes
(continued)

- ***Consider existing inventory.***

Is the entire quantity to be purchased or will some (or all) of it come from existing inventory? The inventory value may be less than the current market price.

- ***Consider any other significant price-related factors.***

What price-related factors are built into (or excluded from) the material price? For instance, does the quoted price cover transportation of the material to the prime's plant? If so, strike any line items in the proposal for those transportation costs. See Chapters 4 and 5 of *Introduction to Price Analysis* text-reference for additional information.

- ***Consider the nature and adequacy of the price competition.***

In your evaluation of subcontract competition, ask the same questions about the existence and adequacy of price competition that apply in evaluating offers for a Government contract. For instance, does the low quoter have such a decided advantage that it is practically immune from competition? See the sections on competition in the *Introduction to Price Analysis* text-reference for additional information.

- ***Compare quoted prices with commercial prices, historical prices, yardsticks, or Government estimates.***

Be wary of quoted prices that are greatly out of line with commercial prices, historical prices, yardsticks, or Government estimates. Rather, ask the offeror to explain the differences, and, in light of those differences, justify the reasonableness of the quoted prices.

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing Historical Quotes or Purchase Prices

You **MUST** be cautious when reviewing estimates of current or future prices based on historical prices. The primary assumption used in these estimates is that the last price paid was reasonable at the time. That may not be true. If you have questions, review the past purchase files.

Be alert to possible discrepancies between the estimating system and the purchasing system. The offeror should always provide you with the most up-to-date information. However, if the firm's estimators do **NOT** communicate effectively with the firm's buyers, the estimators may still be relying on historical costs even though the firm's buyers have obtained current quotes and prices.

If the offeror's estimate is based on historical prices, obtain data on all purchases over a reasonable period of time (e.g., a year) — not just the last several purchases. Determine whether these purchases were made under roughly identical conditions (in terms of such factors as quantities acquired or the degree of competition). For example, the most recent purchase may have been at a relatively higher unit price because the contractor acquired an unusually low quantity (e.g., materials necessary to replace a scrapped part).

Finally, consider changes in the program and the purchase situation since the last purchase:

Specification changes. Changes in specifications can affect material prices. If a particular process, inspection, or specification has been eliminated, the cost of producing the item will most likely drop. If this circumstance exists, the historical price **MUST** be adjusted accordingly.

Purchase situation changes. Consider all the factors that you would consider in any price analysis. As a minimum, ask the following:

- ***How has the contractor's specific purchasing situation changed?***

You need to understand the contractor's acquisition situation as it existed in the previous purchase and how the current acquisition situation differs.

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing
Historical
Quotes or
Purchase
Prices
(continued)

Important data elements include:

- Sources
- Quantities
- Production / Delivery Rates
- Start-up Costs
- Terms of Purchase

If the purchase history is based on sole-source purchases and the item is now being competitively bid, there is an excellent chance that the competitive price will be lower. Either obtain competitive current quotes, or attempt to look at the historical impact of other parts that were transitioned from sole-source to competitive purchase.

The other common circumstance to consider is whether the part to be purchased is currently in production. The price often increases when a part is no longer in continuous production. Typically, this condition arises when the vendor has been supplying the offeror on a continuous basis to support production. When the item is no longer in production, the vendor may incur start-up costs to begin manufacturing the item again. In this situation, it may NOT be possible to use historical prices, or these prices may have to be adjusted to account for the start-up costs.

The opposite situation can also occur. If the last purchase included nonrecurring costs, such as tooling, set-up, or first article expenses, that will NOT need to be charged again, the cost of the current item should reflect only recurring production costs.

- ***How has the general economic situation changed?***

Economic changes are reflected in the general level of inflation or deflation related to the product that you are purchasing. In general, you need to ask: *Have prices done up or down, and by how much?*

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Analyzing Inventory Pricing

Inventory pricing should be used when the offeror intends to use existing inventory to perform the work. Cost Accounting Standards (CAS) allow five inventory costing methods. However, even if the offeror is NOT covered by CAS, these five methods constitute the customary inventory accounting methods used in American industry.

The five methods are:

- First-In-First-Out (FIFO)
- Last-In-First-Out (LIFO)
- Weighted Average
- Moving Average
- Standard Cost

First-In-First- Out (FIFO)

The FIFO method works just as the name implies. For accounting purposes, you assume that the first unit into the inventory is the first unit to be drawn out. The inventory value assigned to the unit drawn out is the value of the first unit recorded as still being in inventory. It does NOT matter which unit is physically drawn out of inventory. It could actually be the newest unit. Under FIFO, the value assigned would still be that of the first unit recorded as being on-hand.

Example. Five widgets are in inventory. The following are the acquisition costs in order of receipt:

unit a @ \$100
unit b @ \$110
unit c @ \$105
unit d @ \$115
unit e @ \$120

During the year, three jobs were performed requiring widgets.

<u>unit a @ \$100</u>	Job One charged \$100
<u>unit b @ \$110</u>	Job Two charged \$110
<u>unit c @ \$105</u>	Job Three charged \$105
unit d @ \$115	
unit e @ \$120	

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Last-In-First-Out (LIFO)

As with FIFO, LIFO is what the name implies. The last, or most recent unit received, will be the first inventory value drawn out. Using the same situation as above, but with LIFO, you would get the following:

Example. Five widgets are in inventory. The following are the acquisition costs in order of receipt:

unit a @ \$100
 unit b @ \$110
 unit c @ \$105
 unit d @ \$115
 unit e @ \$120

During the year, three jobs were performed requiring widgets.

unit a @ \$100	
unit b @ \$110	
<u>unit c @ \$105</u>	Job Three charged \$105
<u>unit d @ \$115</u>	Job Two charged \$115
<u>unit e @ \$120</u>	Job One charged \$120

Weighted Average

The weighted average is a *periodic* method of setting inventory value. Unit values are *only recalculated at designated times*, for example, quarterly. The weighted average is the cost of inventory on-hand divided by the number of units on-hand. Again, using the example above, it would look something like this:

Example. Five widgets are in inventory. The weighted average was calculated as \$110 (See Chapter 6). During the year, the three jobs were performed requiring widgets. Each job was charged \$110, the weighted average calculated at the beginning of the period.

<u>unit a @ \$100</u>	Job One charged \$110
<u>unit b @ \$110</u>	Job Two charged \$110
<u>unit c @ \$105</u>	Job Three charged \$110
unit d @ \$115	
unit e @ \$120	
Total 5 units	\$550

$\$550 / 5 \text{ units} = \$110.00 \text{ weighted average price}$

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Moving Average

A moving average is calculated in the same way as a weighted average except that the calculation is done every time there is a new addition to inventory. Therefore, the inventory value charged to each job will change, depending on whether new inventory has been added.

Example. Five widgets are in inventory. During the year, three jobs were performed requiring widgets. After the completion of Job One, an additional unit was added to inventory. No other units were added after that. Job One was charged \$110 for the widget it used. Jobs Two and Three were charged \$114 each for their widgets.

Original Inventory:

<u>unit a @ \$100</u>	Job One charged \$110
unit b @ \$110	
unit c @ \$105	
unit d @ \$115	
unit e @ <u>\$120</u>	
Total 5 units	\$550

$\$550/5 \text{ units} = \110.00 moving average for 5 original units

Inventory with unit a removed after Job One and unit f added:

<u>unit b @ \$110</u>	Job Two charged \$114
<u>unit c @ \$105</u>	Job Three charged \$114
unit d @ \$115	
unit e @ \$120	
unit f @ <u>\$120</u>	
Total 5 units	\$570

$\$570/5 \text{ units} = \114.00 moving average after one unit removed and one unit added

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Standard Cost	Under standard costing, the value of inventory equals the number of units times the unit standard cost. Standard costs are usually based either on expected prices for the period in question (sometimes as short as a week) or on prices prevailing at the time the standards are set. Standard costs do NOT change in response to short-term fluctuations in volume, quantity, or cost of units.
---------------	--

Difference between the acquisition cost and standard cost of inventory units is called a *variance*. Variance adjustments may be handled by making cost adjustments on each job, or if the cost is insignificant, it can be done as an overhead adjustment.

There may be substantial differences between contractor inventory standard cost systems. If you encounter an inventory standard cost system, ask the contractor to identify the source of the applied standards and to explain any variances. Where possible, contact the responsible Government auditor for assistance.

Inter- organizational Transfer	Interorganizational transfers are materials, supplies, or services that are sold or transferred between any divisions, subsidiaries, or affiliates of the contractor under a common control. As each division of the contractor “sells” the item to the next division, it increases the price to make a profit. This practice is called “pyramiding profits”.
--------------------------------------	---

Example. Division A purchases a component from Division B for \$100.00 (\$90.00 cost plus \$10.00 profit). Division A then includes its profit of \$10.00, making the final price \$110.00 with \$20.00 of “pyramid profit” for the same company.

Transfers at Cost. As you can see in the above example, transfers within an organization MUST be at cost if profit pyramiding is to be avoided. As a result, the Government's position is that interorganizational transfers should be at cost. Moreover, the contractor is responsible for supporting proposed transfer costs and data supporting such proposed costs are subject to audit in like manner to data supporting proposed subcontract costs.

(continued on next page)

7.3.2 Analyze Proposed Unit Prices

(continued)

Inter-
organizational
Transfer

Transfers at Other Than Cost.

WHILE THE PREFERRED METHOD IS TRANSFER AT COST, *TRANSFER CAN BE MADE AT OTHER THAN COST IF:*

1. The offeror's corporate policy is to transfer at other than cost

AND

2. The price paid by the Government is:

- (a) based on established catalog or market price of a commercial item sold in substantial quantities to the general public

OR

- (b) the result of adequate price competition on an equal basis with one or more outside sources that produce the item or its equivalent in significant quantity

BUT EVEN IF THE COST MEETS THE TWO CONDITIONS ABOVE, *THERE ARE STILL TWO LIMITATIONS ON THE COST:*

1. The price **CANNOT** exceed the price paid by the offeror's most favored customer

AND

2. The contracting officer has **NOT** determined the price to be unreasonable

7.4 MAJOR SUBCONTRACT REQUIREMENTS

Section Overview

Overview	<p>No matter whether the direct material cost has been estimated at the summary level or the detailed level, you MUST be concerned with the influence subcontract pricing has had on the cost of the proposal.</p> <p>This section covers the responsibilities of the offeror and subcontractor for cost and price analyses and for providing certified cost or pricing data.</p>
Maps in This Section	<p>This section includes the following map.</p> <ul style="list-style-type: none">• Evaluate Subcontract Pricing

7.4.1 Evaluate Subcontract Pricing

Introduction

Because of their value in relation to total material cost, give special attention to large subcontracts. Basically, the offeror should be making the same effort to ensure fair and reasonable prices with its vendors as you are with the offeror's proposal.

Prime or Higher Tier Subcontracts Respon- sibilities

FAR 15.806

Subcontract evaluation and analysis is the responsibility of the offeror or next higher-tier vendor. This responsibility is based on the concept of “PRIVITY OF CONTRACT”. Privity refers to the direct contractual relationship that exists between parties. The Government has a contract with the prime contractor, therefore there is privity of contract between the Government and the prime contractor. The prime contractor has a contract with its subcontractors, and privity of contract exists between the prime and the subcontractor. However, the Government does not have a contract with the subcontractor; no privity of contract exists between the two parties. Since no contract exists between the Government and the subcontractor, the Government cannot negotiate directly with the subcontractor or direct the subcontractor. While the Government has an interest in the activities and performance of the subcontractors, you must be careful not to violate the contractual relationship. Besides, if you take responsibility for subcontract pricing away from the prime contractor, you will be doing their job for them!

At the same time you are responsible for the total price paid by the Government, and **MUST** be satisfied that each tier has done an adequate and acceptable analysis of each subcontract proposal.

Price Analysis Required. As a minimum, the offeror's records should show evidence of the offeror's price analysis, along with the offeror's assessment of the subcontractor's proposal. The purpose is the same as yours when you perform price analysis—ensuring a fair and reasonable price. In addition the analysis provides you with information that you need to determine if the proposed cost to the Government is reasonable. If you believe that the analysis is inadequate or that the price is unreasonable, you have a right to question the dollars proposed. See the section *Analyze Unit Price Estimates* in this chapter.

(continued on next page)

7.4.1 Evaluate Subcontract Pricing

(continued)

Prime or
Higher Tier
Subcontracts
Responsibilities
(continued)

Cost Analysis When Required. You should expect the offeror to perform cost analysis whenever price reasonableness CANNOT be determined through the use of price analysis alone. Cost analysis is also required for contract actions over \$100,000 (\$500,000 in the DoD), unless the price is based on adequate price competition, catalog prices, market prices, or regulated prices.

The rules on subcontract proposal evaluation that apply to prime contractors apply to subcontractors. Subcontractors MUST evaluate all lower-tier subcontract cost proposals which meet the criteria defined above.

Subcontractor Data Submission. Subcontract cost or pricing data MUST be included in the prime proposal, if the subcontract proposal is:

- \$1,000,000 or more, or
- \$100,000 or more* AND more than 10% of the offeror's proposal

The contracting offer MUST also require cost or pricing data for subcontract proposals below the threshold values if such data are considered necessary to adequately price the prime contract.

Lower-tier subcontract cost or pricing data MUST be included in the subcontract proposal, if the lower-tier proposal meets the criteria defined above.

Including Reviews of Proposals. The offeror is obligated to submit any reviews, assessments, or internally generated cost or price analysis on a subcontractor's proposal. Failure to analyze material costs is considered a potentially significant estimating system deficiency. Absence of such analysis could lead to overpricing and constitute defective pricing.

(continued on next page)

**\$500,000 for DoD, NASA, and the Coast Guard for contracts awarded after December 5, 1990.*

7.4.1 Evaluate Subcontract Pricing

(continued)

Obtaining
Certified Cost
or Pricing
Data When
Necessary

As stated above, if the vendor's proposal is \$1,000,000 or more, or BOTH \$100,000 or more* AND more than 10% of the offeror's proposal, then cost or pricing data from the vendor, along with the vendor's SF 1411 should be part of the offeror's proposal.

Whenever price reasonableness for a subcontract action over \$100,000* is NOT based on price analysis using adequate price competition, catalog prices, market prices, or regulated prices, the offeror is required to obtain certified cost or pricing data from the potential subcontractor prior to award.

It is important to note that agency head (or designee) waiver of the requirement for a prime or higher tier subcontractor to submit certified cost pricing data does NOT automatically waive the requirement to obtain certified data from its subcontractors. Subcontractor data are still required unless the entire proposal is eligible for an exemption from data submission, or the subcontractor's requirement is also waived.

End-of-Chapter Vignette

Andrew is catching on, but he is now getting into cost elements. He has asked your advice on the following questions:

- 1. How did the audit and technical reports determine that the small dollar purchased parts were reasonable?*

- 2. The costs proposed for small dollar purchased parts appear to be fair and reasonable based on the audit and technical reports. Is further analysis required? Why?*

- 3. What important issues in pricing purchased parts were not addressed in the audit and technical reports?*

(continued on next page)

End-of-Chapter Vignette

(continued)

4. *Commercial items were priced as catalog priced items. Should Sooper Antenna be granted a waiver of the requirement for cost or pricing data? Why?*
5. *Does granting Sooper Antenna a waiver require you to accept the proposed price?*
6. *Develop a cost estimating relationship (CER) using the antenna data in the technical report. Using the CER, what is your estimate of a reasonable price?*

(continued on next page)

End-of-Chapter Vignette
(continued)

Direct Material Summary Table

MATERIAL COST	PROP	AUDIT	TECH. REPORT	ACO REPORT	YOUR OBJECTIVE
Purchased Parts*					
Sooper Antenna*					
Scrap & Usage Rate					

**Do NOT include scrap cost in material estimate.*

Rationale for position on purchased parts:

Rationale for position on Sooper Antenna

Rational for position on scrap and usage:

*NOTE: We have included a copy of this form in the Student Workbook
for use with the Macro exercise.*

Chapter Vignette

Analyzing Direct Labor

The same reports that Andrew used for analyzing direct material also addressed direct labor. “Considering that Wesley Electronics has built a lot of these radios in the past, you would think the labor hours would be pretty well set, but these reports seem to be taking large exceptions to the proposed hours,” Andrew told Kay.

Kay told Andrew not to get ahead of himself. “review the methods available to you for analyzing direct labor and then study the reports. Give it your best shot, then bring it to me and we will look at how you are doing.”

Course Learning Objectives

At the end of this chapter, you will be able to establish prenegotiation positions for direct labor costs, based on an analysis of the proposed:

1. Labor Mix
2. Labor Hours
3. Labor Rates

Chapter Overview

Overview Estimating and analysis of direct labor costs require consideration of two major elements:

1. labor hours worked or projected to be worked
 2. the cost per hour in dollars.
-

Maps in This
Chapter

This chapter contains the following maps:

8.1 ANALYZE DIRECT LABOR MIX.....	8-5
8.1.1 Identify Classifications of Direct Labor	8-6
8.1.2 Major Types of Direct Labor	8-8
8.1.3 Analyze Direct Labor Mix	8-9
8.2 ANALYZE LABOR HOUR ESTIMATES.....	8-11
8.2.1 Round-Table Estimates	8-16
8.2.2 Comparison Estimates	8-19
8.2.3 Improvement Curves	8-26
8.2.4 Labor Standards	8-31
ANALYZE WAGE RATES	8-39
8.3.1 Wage Rate Analysis.....	8-40
8.3.2 Geographic Location	8-41
8.3.3 Variation in Skill.....	8-43
8.3.4 Time Period of the Labor Requirement	8-47
8.3.5 Conditions in the Work Force.....	8-51

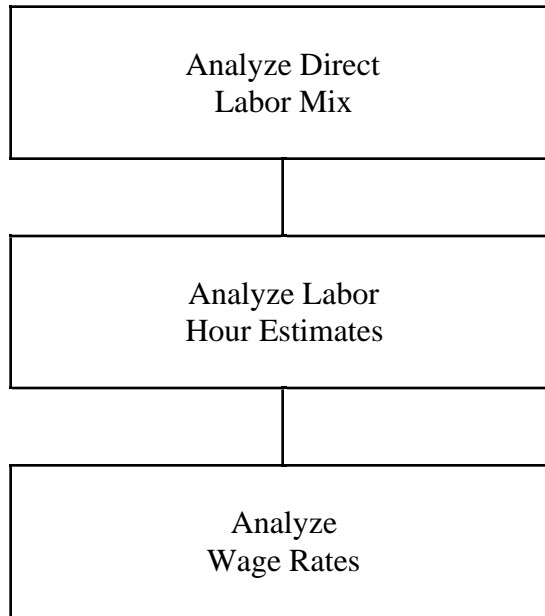
(continued on next page)

Chapter Overview

(continued)

Overview Flowchart

This flowchart shows the relationship of the sections in this chapter.



8.1 ANALYZE DIRECT LABOR MIX

Section Overview

Overview	<p>The first step in estimating or analyzing direct labor cost is to identify the types of labor that are necessary for the work required by the contract. In your analysis of the offeror's proposal, you must assure that the offeror has proposed an economic and efficient mix of labor to meet contract requirements. This section covers three common types of direct labor:</p> <ul style="list-style-type: none">• engineering• manufacturing• services
Map in This Section	<p>In this section is the following map:</p> <ul style="list-style-type: none">• Identify Classifications of Direct Labor• Major Types of Direct Labor• Analyze Direct Labor Mix

8.1.1 Identify Classifications of Direct Labor

Introduction	<p>Each offeror should have a position classification system. An understanding of the types of information available from this system can help you determine the appropriateness of proposed labor. The position classification of the proposed labor should be consistent with the tasks to be performed. For example, when the Government performs a formal contractor employee compensation review, the audit team will rely heavily on offeror personnel classification data and comparisons with compensation paid by other firms using similar labor and prevailing labor rates in the local area.</p> <p>To understand the offeror's classification system, you must to be familiar with three terms: Position; Class of Positions; and Position Classification Plan.</p>
Position	<p>The work, consisting of duties and responsibilities, assigned to an employee. In most cases, the offeror should be able to produce a Position Description for each position which states the duties and responsibilities of that position and qualification requirements (e.g., the required experience, skills, knowledge, and educational need to work in the position).</p>
Class of Positions	<p>All positions that share the same title and pay level. For example, “Senior Electrical Engineer - Pay Level IV” is the title of a class of positions. Normally, positions are assigned the same title and pay level only if the workers in the positions perform duties that:</p> <ul style="list-style-type: none">• Are comparable in kind or subject matter• Are at the same levels of difficulty and responsibility• Require the same basic qualifications
Position Classification Plan	<p>Sometimes called a Job Evaluation Plan, such plans identify the classes of labor employed by a firm, and provide guidelines for determining the title and pay level of each position in the firm. Guidelines are generally in the form of job factors, degree requirements, skill qualification requirements, conversion tables (such as the possible trade-offs between education and experience), and the like.</p>

(continued on next page)

8.1.1 Identify Classifications of Direct Labor

(continued)

Position Classification Plan	The position classes and wage rates proposed should be consistent with the offeror's classification plan. In other words the offeror should not propose top scientists to perform the type of work normally assigned to a journeyman engineer. If a top scientist is proposed to perform work normally assigned to a journeyman engineer, the offeror must demonstrate related savings, such as a reduction in the total hours required.
------------------------------------	--

8.1.2 Major Types of Direct Labor

Introduction

While each offeror will have different terminology and different ways of categorizing their labor force, the two most common and largest types of direct labor in production contracts are engineering and manufacturing.

Engineering Labor

Engineering involves a variety of activities associated with research, design, and development or preparation of products and procedures. Normally, the major portion of engineering activity is classified as direct labor cost. If there is any question as to the proper classification of engineering labor as direct cost versus indirect cost, ask the responsible government auditor for clarification and assistance. The critical issue for you is to assure that the offeror is consistent in cost classification and does not change classifications from contract to contract or within a contract.

EXAMPLES OF ENGINEERING CLASSIFICATIONS	DESCRIPTION
Design Engineering	Involves delineating the end product's characteristics and specifications
Manufacturing Engineering	Involves manufacturing planning, process instructions & work methods, shop loading, organizing work stations, and matching shop capabilities to contractual requirements
Reliability & Maintainability Engineering	Involves designing and manufacturing products to meet longevity and repair requirements
Quality Assurance Engineering	Involves the formulation of standards and specifications for tests and inspections
Sustaining Engineering	Involves "as needed" support as problems arise throughout the life of the contract

(continued on next page)

8.1.2 Major Types of Direct Labor

(continued)

Manufacturing Labor

Manufacturing labor is the “hands-on” effort to produce a product. Inspection, while normally a direct cost, is often allocated to each job as an indirect cost. As with engineering, if there is any question on the proper classification of cost, seek clarification and assistance from the responsible government auditor.

EXAMPLES OF ENGINEERING CLASSIFICATIONS	DESCRIPTION
Fabrication Labor	Involves the fashioning of parts from raw or purchased materials
Assembly Labor	Involves the effort to combine parts into subassemblies and assemblies
Quality Control Labor	Involves the act of testing or inspecting the product during the manufacturing process and prior to final acceptance

Services Labor

Direct services labor can cover a wide range of contract activities. It can be the “hands-on” labor required to prepare food or wax a floor. It can also be the “hands-on” labor required to produce less tangible products such as technical studies or professional advice. The classifications of services labor vary widely with the work to be performed.

The solicitation may define labor categories to which the offeror must conform. Solicitation defined labor categories may cut across several offeror labor categories. In such situations, the offeror should identify the labor classifications that were blended to meet solicitation requirements.

If there is any question on the proper classification of labor, seek clarification and assistance from the responsible Government auditor.

(continued on next page)

8.1.2 Major Types of Direct Labor

(continued)

Services Labor

(continued)

Sample Professional Services Classifications.

PAY LEVEL	TITLE (JOB FAMILY I)	TITLE (JOB FAMILY II)	TITLE (JOB FAMILY III)
I	Principal Program Analyst		Principal Systems Analyst
II	Senior Program Analyst	Principal Instructional Technician	Senior Systems Analyst
III	Program Analyst	Instructional Technologist	Associate Systems Analyst
IV	Associate Program Analyst	Junior Instructional Technologist	Associate Systems Analyst
V	Assistant Program Analyst		Assistant Systems Analyst

Sample Clerical & Technical Services Classifications.

PAY LEVEL	TITLE (JOB FAMILY IV)	TITLE (JOB FAMILY V)	TITLE (JOB FAMILY VI)
III	Word Processing Document Administrator		
IV	Word Processing	Secretary	Senior Data Entry Operator
V	Word Processing Trainee	Receptionist	Senior Data Clerk
VI	Data Entry Operator	Clerk Typist	Data Entry Operator
VII			Data Entry Operator

8.1.3 Analyze Direct Labor Mix

Introduction

The offeror may propose the labor mix by identifying different skill levels of each type of labor, such as “Fabrication Level I and Fabrication Level II,” or the firm may only identify “Fabrication” with the different levels considered in development of a weighted average labor rate (for more information on weighted average labor rates see Section 8.3.2). Either way, you must analyze the rationale used by the offeror in developing the proposed labor mix.

Analysis

Procedure

STEP	ACTION
1	<p>Determine whether the offeror has proposed the most efficient and economical division of labor between the different classes of labor.</p> <ul style="list-style-type: none"> Is the class of labor necessary? Based on your analysis of work design (Chapter 5), you may believe that a subassembly should be purchased rather than made, or that certain tasks should be eliminated or modified. Are the proposed titles and pay levels consistent with the firm’s position classification or job evaluation plan? If the proposed titles are not consistent with the offeror’s job evaluation plan, then there is a good chance that the proposal was not prepared in accordance with their normal estimating procedures. This type of failure often results in increased costs. Also, inconsistencies in this area imply that the offeror may intend on providing the Government with lesser skilled personnel than the Government is anticipating. Do the proposed titles and pay levels match requirements of the RFP? Many RFP’s for professional services list the types of skills necessary for the work. Due to nomenclature differences, it may be hard to tell if the offeror’s proposed job classifications really match the Government’s needs. In this case, seek technical assistance. Beyond the potential problem of paying too much for less than desired levels of labor, there is the possibility that the offeror’s proposal may be non-responsive to the RFP. Is the structured breakdown (see Chapter 5) linked to the proposed classes of positions in a manner that permits you to identify the labor mix for each task? <p>(Step 1 continued on next page)</p>

8.1.3 Analyze Direct Labor Mix

(continued)

Analysis
Procedure
(continued)

STEP	ACTION
1 (cont'd)	<ul style="list-style-type: none"> Are you being double billed for the task? Watch for overlaps in tasks. For example, in writing technical publications and manuals, where do responsibilities of the design engineer for preparing drawings, supporting materials, and documentation end and the responsibilities of the technical writer to transform these materials into a document begin? It is possible that both engineering and technical writing may have budgeted and proposed hours to perform the same work. In this case, you must identify and eliminate the duplicate hours AND make sure that the remaining hours are recognized in the correct functional area. Are assigned tasks consistent with position descriptions for those employees? When lower skilled classifications are assigned outside of their position description to higher skilled tasks, you are not getting what you paid for! Going the other way, if higher skilled people are proposed on lesser tasks, you will pay an excessive amount for the value of work performed. Does the proposed labor mix better represent (a) the firm's available work force, or (b) the skill mix actually needed for work under the contract? If the proposed labor is more a representation of the offeror's work force than your needs, then you may run the risk of "carrying" the offeror's excess work force capacity rather than buying the labor needed to perform your contract at a fair and reasonable price. Is the proposed labor mix consistent with the historical mix for the task? If the historical mix has been different than proposed, then the offeror must explain why the change is necessary and reasonable. Even if the mix is consistent with the past, you may want to consider if there should be a change. For example, when a product is new, the need for more highly skilled engineers may be evident. As a product matures and moves into the later stages of its product life cycle, less skilled (and less expensive) engineers may be more appropriate.

8.1.3 Analyze Direct Labor Mix

(continued)

Analysis

STEP	ACTION
2	<p>Determine whether any of the proposed costs are covered in an indirect cost pool.</p> <ul style="list-style-type: none"> <p>Has the offeror consistently treated this type of labor as a direct cost?</p> <p>Similar costs incurred under similar circumstances should be consistently charged. For example, if shop expeditors have been historically charged to overhead, then shop expeditors should always be charged to overhead when performing their normally assigned functions. Sometimes, technical evaluators object to classifying a cost as direct because other contractors typically classify the cost as indirect. However, the issue is not how other contractors classify the cost but rather how this firm's estimating and accounting systems treat the cost.</p> <p>Will each hour charged to this contract benefit only the work of this contract?</p> <p>There may be situations where an employee is charging part-time to your contract, part-time to other contracts, and part-time to overhead (e.g. a lead engineer who does both team management tasks and "hands-on" design work). Only those hours related to direct tasks on your contract should be recognized as a direct charge on your contract. Any indirect tasks, such as team management, will be covered by application of overhead rates.</p> <p>Is it practical to account for this labor as a direct cost?</p> <p>Good cost accounting practices will specifically identify tasks to contracts whenever it is practical. However, if there is a question of whether a cost should be a direct cost or is already covered in an overhead account, seek assistance from the responsible Government auditor.</p> <p>Are you being double-billed for the labor?</p> <p>Again, if there is any question of whether a cost should be a direct cost or is already covered in an overhead account, seek assistance from the responsible Government auditor. Another way to quickly check for such mischarging is to audit the employee's time card. If the employee is charging time to a charge number that goes to an overhead account, then it is not a direct cost and you have been double-billed. NOTE: The ramifications of this type of labor voucher mischarging can be very serious.</p>

8.1.3 Analyze Direct Labor Mix

(continued)

Analysis

STEP	ACTION
3	<p>Determine the realism of the proposed skill mix.</p> <ul style="list-style-type: none">• Has the offeror accounted for all probable types of labor required?• Is the proposed labor mix technically acceptable? <p><i>For additional information on these questions, see chapter 14 Cost Realism.</i></p>
4	<p>If you have problems with the proposed skill mix, document your findings and reflect the results in your prenegotiation position.</p>

8.2 ANALYZE LABOR HOUR ESTIMATES

Section Overview

Overview This task entails two separate but related steps. First, analyze how the offeror estimated the hours and the appropriateness of the offeror's judgement given their estimating system, accounting system, their assumptions, and reliability of the estimating method used. Second, develop your own independent estimate of the required labor hours, drawing from your own resources including audit reports and technical analysis. Judgement must be used to select the method that best estimates the effort required.

This section covers four commonly used classifications of techniques for estimating labor hours:

- round-table estimates
 - comparison estimates
 - improvement curves
 - labor standards
-

Maps in This Section This section contain the following maps:

- Round-Table Estimates
 - Comparison Estimates
 - Improvement Curves
 - Labor Standards
-

8.2.1 Round-Table Estimates

Introduction	<p>As stated in Chapter 1, experts develop round-table cost estimates based on their experience and judgement without detailed support. Round-table estimating should only be used in situations where detailed drawings, bills of material, and firm specifications are not available. As a result, the estimates are most applicable to research and development contracts and contracts requiring significant engineering and limited production labor. Carefully scrutinize all round-table estimates to assure that sufficient information and historical data are not available for a more detailed method of cost estimation.</p>
--------------	--

Estimate Development	<p>Most round-table estimates are based on some form of level of effort analysis. The level of effort may be related to completion of a specific task or a more general effort such as management of a program.</p> <p>Task Estimating. The task estimating method is used primarily in connection with contracts for research and development. Task estimates may be summary level estimates of the time to complete an entire project or lower level estimates of the time to design a particular component.</p> <p>The offeror may assign a single estimator or a group of estimators to develop the estimate. The estimators will define the effort required in general terms and use that definition to estimate the number of people and the time required to perform the task.</p> <p>For example, the Government might require the development of a new item or system. The item or system has never been built before or is radically different from other products that perform similar functions. After generally defining the work required, estimators might estimate that the design will be a two year effort requiring the full-time efforts of one senior engineer, two journeyman engineers, and two design assistants.</p>
----------------------	--

(continued on next page)

8.2.1 Round-Table Estimates

(continued)

Estimate
Development
(continued)

Level of Effort Estimating. The level of effort approach assumes that the required effort is closely related to time. The approach is commonly used to estimate the hours to perform repetitive tasks such as those found in project management and administration. For example, the estimator may forecast that a full-time project manager will be required to manage the project described above until it is completed. The estimate is based on both the length of the project and the estimate of the effort required in any one time period.

Estimate
Analysis

Estimate Analysis. Since round-table estimates are based on expert judgement, your best bet is to gather your own team of technical experts to confirm or refute the estimate prepared by the offeror.

As a minimum, you should require the offeror to document the definition of the task used in preparing the estimate and the rationale used to develop the estimate. The rationale may be brief, but it must describe the process and assumptions used in preparing the estimate.

Analysis of round-table estimates should be shaped by consideration of project complexity, availability of personnel, and professional judgement.

- ***How complex is the contract effort?***

A more complex effort will require more time and higher levels of skill than a less complex effort. If the offeror will be advancing the state-of-the-art, personnel will be operating outside known performance norms. New techniques, methods, and materials may be required. Such requirements may drastically increase the labor-hours and skill levels estimated.

The complexity of a task is relative and determining the level of complexity is usually rather subjective. You might be able to develop a feel for the complexity of a task by relating it to the effort required to perform a similar task.

(continued on next page)

8.2.1 Round-Table Estimates

(continued)

Estimate
Analysis
(continued)

Do not be misled. For years, the Government and its contractors have pushed forward the state-of-the-art in many fields. Today's knowledge is far broader than it was a few years ago. Because complexity is relative, the problems of today, relatively speaking, may be easier to solve than the less complex problems of the past.

- ***How many labor hours are available to perform the required effort?***

In many cases, the effort will expand to consume the time available. This is particularly true in a sole source contracting environment.

An offeror's efforts to maintain product technological superiority often result in a tendency to propose an excessive labor effort in terms of both hours and skills. Lack of other business can have a similar effect.

Accept only the hours and skills required to perform the contract requirements. One method of evaluating labor requirements is to ask how labor will be selected and scheduled on the job. If the offeror cannot answer such questions, there is a good chance the proposed labor effort is excessive.

- ***What does YOUR professional JUDGEMENT tell you?***

It is not enough to ask for the advice of technical experts. Ask questions until YOU understand. You will receive two benefits from asking questions: Little by little you will learn about the labor specialties and the language involved in performing the work required, and you will become more confident in your objective if you truly understand the contract effort required.

8.2.2 Comparison Estimates

Introduction	As described in Chapter 1, comparison estimating involves using the historical cost of the same or similar item and adjusting or projecting that cost for current or future production. The comparison can be accomplished at the summary level or for the performance of a particular task.
--------------	--

Estimate Development	<p>Comparisons can be simple or involve the use of complex quantitative techniques. The three most common forms are:</p> <ul style="list-style-type: none"> • Direct comparison • Comparison using cost estimating relationships • Comparison using improvement curves (Because improvement curves are used both in comparison estimating and detailed estimating with labor standards, their use is examined in a separate section below.)
----------------------	--

Direct Comparison. Comparisons may be based on a direct comparison with the hours it took to perform the same or similar effort in the past. The effort may be a specific task or a level of effort. The comparison may be used to estimate the labor cost for an entire contract or a segment of the contract. Remember even in a contract for a unique requirement, there may be elements that are similar to the work performed in past contracts.

Often an offeror will estimate costs based on past costs plus an adjustment. One of the most common methods of making adjustments — improvement curves — will be addressed below. Another common adjustment is an adjustment for differences in the effort itself. A product may be similar to but slightly different than a product that the offeror produced before, or the same product may have been produced under slightly different conditions.

Adjustment factors are commonly given names such as, “plant condition factor,” “manufacturing allowance,” or “complexity factor.” For example, the estimate may state that the effort on a particular contract is similar to the effort on a previous contract but is 20 percent more complex. When an adjustment factor is used, the offeror must document both the need for such a factor and the actual amount of the adjustment.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Development
(continued)

Cost Estimating Relationships. As described in Chapter 6, there are two different types of cost estimating relationships that can be used in cost estimating: cost-to-cost or parametric.

The *cost-to-cost relationship* relates an estimate of one cost based on the estimate of another cost. In labor relationship development, cost can be measured in dollars or in labor hours. For example, the offeror may estimate, based on historical experience, that for every hour worked by a senior engineer on the task, engineering assistants will work two hours.

The *parametric relationship* relates an estimate of labor requirements to a physical or performance characteristic of the product. For example, the offeror may estimate the labor effort is related to the size of the item produced.

When a cost estimating relationship is used, the offeror must provide you with the information to verify the existence and accuracy of the relationship. The information may be provided with the proposal or by specific reference in the proposal.

Estimate
Analysis

Whenever possible, you should obtain the support of Government technical personnel in the evaluation of the appropriateness and reasonableness of the estimating method and resulting estimate.

Analysis of any labor estimate based on historical labor costs should consider the situation that existed when the costs were incurred and changes since that time. Different comparison techniques also require special consideration in analysis.

General Questions for Analysis

- ***Are the methods to be employed on this contract identical to those used on the prior work?***

If methods have changed, the value of comparison estimates is open to question. You are in effect comparing apples and oranges. For example, the acquisition of new labor saving equipment could significantly reduce the labor hours required on the contract.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Analysis
(continued)

-
- ***Do the historical costs represent efficient application of labor to contract completion?***

If a one-time problem occurred during performance of the prior contract and no adjustment is made, you will be assuming that the same problem or a similar problem will occur on the current contract. See Chapter 5 for more information on analysis of offeror planning assumptions.

- ***Do historical costs include the cost of changes?***

If the cost history includes the cost of changes, a cost estimate based on that history will project similar changes in the future. It may be necessary to purge the history of costs that are not anticipated to be part of the proposed work. Examples of costs that may need to be purged include: non-recurring costs, engineering changes, program redirection, rework, production start-up, and production stretch-outs.

- ***Has the make-or-buy plan changed?***

If the offeror is now buying items that were previously made, the historical data should be adjusted to preclude estimating the labor cost to make an item that is being purchased.

- ***Are labor functions that are included in the historical costs also estimated separately?***

If there are, the offeror has double estimated the cost. It must be eliminated in one estimate or the other. The time for rework and repair is an important example. Actual costs typically include the time for rework and repair. If such costs are included, do not accept any additional factors for rework and repair.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Analysis
(continued)

- ***Are the historical data complete?***

The history should be current and complete. It should include all relevant cost history available up to the present. Insure that portions of the relevant history are not missing, and that latest cost history is included.

- ***How “good” are the data?***

The responsible Government auditor can provide guidance on the acceptability of the offeror's cost accounting system. If the auditor feels that the offeror's system lacks appropriate checks and balances or is riddled with errors or has resulted in mischarging, then the accuracy and reliability of the data are questionable.

- ***Does application of the should-cost principles presented in Chapter 5 reveal incidents of uneconomical or inefficient performance?***

Use of cost history without critical examination could perpetuate the inefficiencies and problems of the past.

- ***Can trend analysis or improvement curve theory be applied to the historical data?***

If the offeror has had experience in making this or a like deliverable, examine historical data for evidence of trends in labor hours per unit. If there is such evidence, trend analysis or improvement curve theory could result in a more accurate projection of future labor hours.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Analysis
(continued)

-
- ***Did the offeror correctly adjust the estimate for all significant changes in the production environment since the last contract?***

When the offeror has used historical data to estimate labor hours, look for any significant differences in working or operating conditions that could throw off the estimate. For instance, be alert for differences in:

- Specifications (especially if specifications have been simplified since the last production run)
- Process steps
- Equipment and tooling
- Plant layout
- Inspection procedures
- Labor mix
- Employee skill levels
- Type of shop (e.g. model vs. production)
- Delivery schedules
- Production rates and quantities
- Plant capacity (full vs. idle)
- Number of shifts
- Hours of overtime

Work with Government technical personnel and the cognizant auditor to ensure that the offeror (1) identified every significant difference in working or operating conditions and (2) has appropriately adjusted the estimate for each such difference.

- ***If the offer includes an adjustment factor, is the adjustment factor reasonable?***

The offeror may have provided separate estimates for such factors as fatigue and rework. The offeror **MUST** document the need for each such factor and the actual amount of the adjustment. Work with Government technical analysts to evaluate this documentation. Also, be sure that the offeror has **NOT** double-counted the hours for those factors—both in the estimate of base hours (if projected from unadjusted historical data) and as a separate factor.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Analysis
(continued)

Special Cost Estimating Relationship Considerations for Analysis

- ***Does the information provided by the offeror verify the existence and accuracy of the proposed relationship?***

Audit personnel can be helpful in verifying the accuracy of the data and the analysis. Technical personnel can be helpful in analyzing the technical validity of the relationship.

- ***When a cost-to-cost relationship is used, are there any trends in the available cost data?***

Costs for such labor effort as rework are commonly estimated as a factor of production labor. As production continues, the production effort should become more efficient and produce fewer defective units which require repair. The factor should decrease over time. You should also consider the following related questions. Is the rate distorted by one bad run? What is being done to control the rate? What else can be done?

- ***Is the CER used consistently?***

If a CER is used to propose an element of cost, it should be used in all similar proposals. Since the CER factor can be thought of as the nominal or mean value, some jobs will incur more cost, others less. If the CER is valid, the variances will be minor and average out across all proposals. To use a CER in some cases and a discrete estimate in others destroys the CER's usefulness by over or understating costs across all proposals. For example, using the average unless a discrete estimate is lower/higher negates the averaging out of the cost across all contracts and will be unfair to one of the contracting parties.

- ***Has the CER been consistently accurate in the past?***

No matter how extensive the cost data or how sophisticated the mathematics, if a CER does not accurately project costs, then it is not a useful tool.

(continued on next page)

8.2.2 Comparison Estimates

(continued)

Estimate
Analysis
(continued)

- ***How current is the CER?***

Even the most accurate CER needs to be reviewed and updated. While the time interval between updates will differ with CER sensitivity to change, in general a CER should be updated and reviewed at least annually. Depending on the potential dollar value and potential for CER rate changes, it may be necessary to monitor the behavior of the costs covered by the CER more frequently.

- ***Would another base be better for developing and applying a CER in estimating direct labor cost?***

If another base (independent variable) would consistently provide a more accurate estimate, then it should be considered. However, remember that the CER is applicable to all proposals, not just yours. It is possible that a CER which works well on your contract would not work well across the entire contract population. When assessing the validity of a CER, all affected contracts must be considered.

- ***Is the CER a self-fulfilling prophecy?***

A CER is intended to project future cost. If the CER simply “backs in” to a rate that will spread the cost of the existing capacity across the affected contracts, then the CER is not fulfilling its function. If you suspect that a CER is being misused as a method of carrying existing resources, you should consider a should-cost type review on the functions represented by the CER.

- ***Would use of labor standards or direct comparison with actuals from a prior effort produce more accurate results?***

Development and use of labor standards can be time consuming and costly, but the application of engineering principles required for standard development is particularly valuable in estimating cost of efficient and effective contract performance.

8.2.3 Improvement Curves

Introduction

As covered in Chapter 6, improvement curves may be used to quantify and project future cost based on the trend of historical improvement. For example, the basic unit curve theory states that as the number of units produced doubles, the cost per unit decreases by some constant percentage.

The following table provides an example of the improvement that results when a unit improvement curve with an 80 percent slope is found to exist in a contracting situation.

UNITS PRODUCED	HOURS PER UNIT AT DOUBLED QUANTITIES	DIFFERENCE IN HOURS AT DOUBLED QUANTITIES	RATE OF IMPROVEMENT (%)	SLOPE OF CURVE (%)
1	100,000			
2	80,000	20,000	20	80
4	64,000	16,000	20	80
16	51,200	12,800	20	80
32	40,960	10,240	20	80
64	32,768	8,192	20	80

Applying Improvement Curves

The improvement curve is widely used in estimating the cost of production labor. It can also be applied in estimating the labor hours for certain types of engineering, construction, and services labor. In determining if the improvement curve has application to a particular effort consider the following questions:

- ***Is there a significant amount of manual labor in the contract?***

If there is a significant amount of labor, the application of the improvement curve may be viable. If the work is “machine paced” or part of an assembly line with a fixed, constant work flow, the possibilities for improvement will be limited.

(continued on next page)

8.2.3 Improvement Curves

(continued)

Applying
Improvement
Curves
(continued)

- ***Does the work proceed without interruption?***

There can be minor interruptions, but if major elements of production (tooling, setups, workers, etc.) are interrupted, improvement may also be disrupted. Each time a major interruption occurs, improvement will be lost. The amount of lost improvement will depend on the length of the interruption and other factors.

- ***Does the contract effort involve complex labor effort?***

While improvement is possible with any effort, more complex efforts tend to offer greater opportunity for improvement. Some categories of labor effort will show an historical tendency toward a greater or lesser slope. For example, in aircraft production airframe assembly will generally exhibit greater improvement than the aircraft's electronic subassemblies.

- ***Will the labor effort involve major technological changes?***

Significant technological change can disrupt improvement. If constant change is expected, opportunities for improvement will be limited.

- ***Is there continuous management pressure to improve?***

If the offeror is not motivated to improve, little improvement will occur. If you encounter this situation, and all conditions indicate that an improvement should take place, consider using a should-cost point of view that would focus on what the cost should be if the offeror were making a reasonable attempt at improvement. If you accept, unquestioned, the offeror's general lack of improvement, you are almost guaranteed that improvement will never occur!

(continued on next page)

8.2.3 Improvement Curves

(continued)

Estimate Development

There are numerous improvement curve theories that are used to estimate labor cost. There are hundreds of articles written on the proper methods to use in applying the improvement curve. It is therefore imperative that the offeror's proposal define the assumptions behind its improvement curve. The validity of the assumptions significantly affect the validity of any estimates developed.

Proposal documentation should include:

- A statement describing the improvement curve theory used in developing the estimate.
- A summary of labor cost data for the product being purchased and any similar products.
- A description of how available data were used in estimating the theoretical cost of Unit #1 and the slope of the curve.
- A statement on how the data were used in estimate development.

Estimate Analysis

- ***Does the offeror use the improvement curve in applicable situations?***

Consider the questions above on the use of the improvement curve. If the answers indicate that use of the improvement curve is viable and the offeror did not consider its use in the proposal, obtain available data and prepare your own improvement curve analysis.

- ***Did the offer provide the information described in the section on estimate development?***

If not, obtain the data to understand how the estimate was developed.

- ***Does that information provide a valid base for estimate development?***

Like CERs, improvement curves are a form of comparison estimate. For the most part, the general questions on pages 8-20 through 8-23 apply to the historical data from which the offeror derived the improvement curve. Unless you are satisfied that the historical data provide a valid base for the improvement curve, estimates based on the curve are suspect.

(continued on next page)

8.2.3 Improvement Curves

(continued)

Estimate
Analysis
(continued)

-
- ***Did the offeror properly apply improvement curve theory to the available data?***

Verify the application of the improvement curve to the data available. Remember that different improvement curve models will produce different results.

For instance, you may find that a unit curve will provide more reasonable results than a cumulative average curve provided by the offeror. Auditors commonly examine the results of both curves when an offeror proposes using a cumulative average curve, because cumulative average curves often conceal significant fluctuations in per unit labor hours. See “Basic Improvement Curve Theories” on page 6-79 for more information on unit and cumulative average curves.

- ***Did the offeror isolate costs associated with contract changes and production interruptions?***

Changes and production interruptions disrupt improvement. If their effects are not identified and considered in analysis, labor estimates will typically overestimate actual labor requirements. Random fluctuations around an improvement curve line-of-best-fit should be expected. However, if costs increase or decrease dramatically, you should suspect that the actuals have been affected by a change or a break in production. In that case, contact the cognizant auditor and Government technical personnel for assistance in your analysis.

On the other hand, an offeror might overstate the impact of an interruption in production—contending that the interruption has been so long that it will have to start from scratch. However, improvements in unit costs result in part from such factors as better product design, tooling, work methods, and work layout. If these were properly documented, some of the improvement should carry over to the new effort—regardless of the length of the interruption or turnover of personnel.

(continued on next page)

8.2.3 Improvement Curves

(continued)

Estimate
Analysis
(continued)

-
- ***Does the offeror's proposal project continued improvement?***

Occasionally, an offeror will propose “negative learning.” In other words, as more units are produced, the cost per unit increases. Do not accept the negative learning argument. If something has significantly changed, consider starting a new curve with a new first unit value and slope.

- ***Does the improvement curve estimate include the costs of rework and repair?***

The effort for rework and repair may or may not be included in the costs projected with the improvement curve. Therefore, you need to determine if these costs are included in the projected costs before allowing any add-on factors for rework or repair.

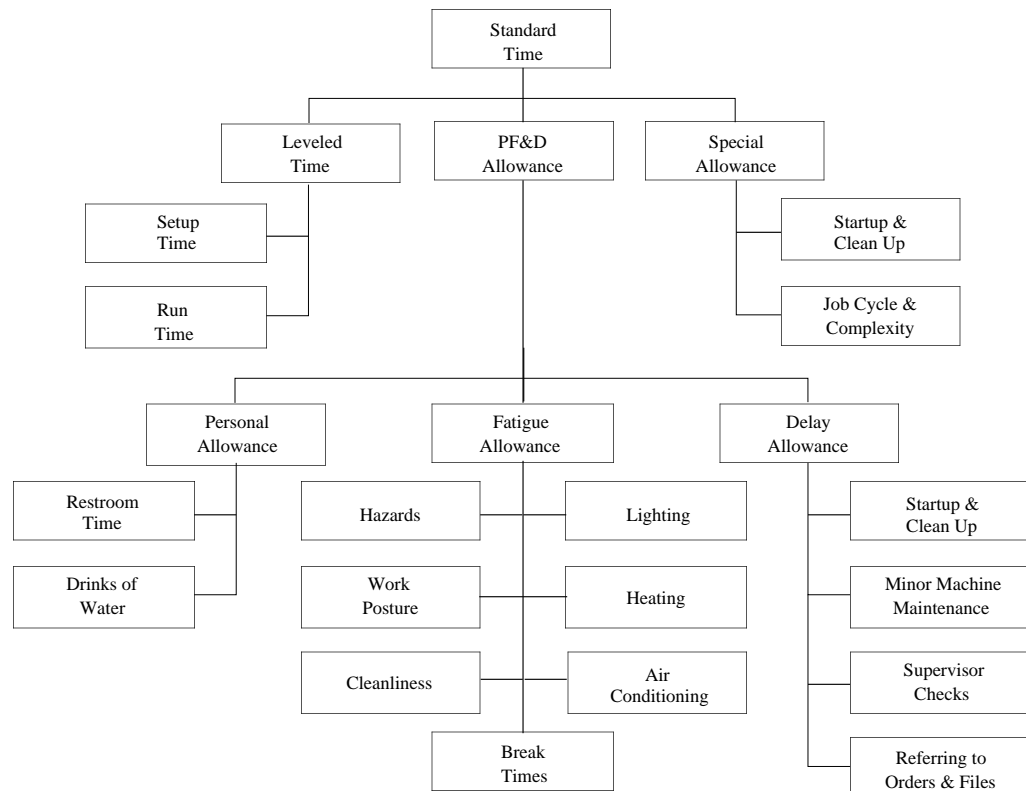
8.2.4 Labor Standards

Introduction

Labor standards are developed when a firm expects workers to perform the same tasks repetitively over an extended period of time. The standard becomes the benchmark against which actual performance is measured. When labor standards are used in cost estimating labor hours, the estimate will be composed of two components: the time standard and a realization or efficiency factor.

Definition

A **labor standard** is the time necessary for a qualified worker, working at a normal pace, under capable supervision, with normal fatigue and delays, to perform a defined task. The standard time is composed of three elements: leveled time; a personal fatigue, and delay (PF&D) allowance; and any special allowances. The figure below depicts the factors that are considered in labor standard development.



(continued on next page)

8.2.4 Labor Standards

(continued)

Leveled Time

Leveled Time is the time that a worker of average skill, making an average effort under average conditions, would take to complete the required task. The four most commonly used techniques for determining leveled time are: Time Study, Predetermined Leveled Time, Standard Time Data, and Work Sampling.

Industrial engineers (or other such analysts) begin a **Time Study** by identifying and defining tasks and subtasks. Each subtask constitutes a distinct, describable, and measurable unit of work (or element of the job). After precisely defining the subtasks, the engineer observes workers as they perform the subtasks and clocks the time spent on each. Then the engineer records the times and assigns a pace rating based on an evaluation of how the ability and effort of the worker being timed compare with those of an average worker. Using the pace ratings, the engineer converts observed times into a Leveled Time for the subtask.

Rather than performing a separate Time Study for each job, many firms prefer to use Predetermined Leveled Times or Standard Time Data derived from observations of similar tasks from various jobs.

Predetermined Leveled Times (PLTs) (also called Predetermined Standards or Basic Motion Standard Data) are established for basic body motions, such as reaching for a part or grasping a part. PLTs may come from published standards in tabular or electronic forms, or the firm may develop its own. The industrial engineer (1) identifies and records the body motions of skilled practitioners as they perform a task, (2) looks up the PLT for each such motion, and (3) sums the PLTs to establish an overall Leveled Time for the task.

Standard Time Data (or Elemental Standard Data) are developed for groups of motions that are commonly performed together. Each such group constitutes a separate and distinct “element”. Rather than timing every separate motion, an industrial engineer clocks the time spent on the element as a whole. After a series of such observations, the engineer establishes a “Base Time” for the element in an “Element Master Sheet”. To estimate the Leveled Time required for a task, the industrial engineer (1) identifies and records the elements that comprise the task, (2) looks up the Base Time for each element, and (3) totals the Base Times to arrive at an overall Leveled Time for the task. Analysts often prefer “Standard Time Data” to “PLTs”, because (1) standard deviations for elements tend to be smaller (relatively speaking) than those for basic motions and (2) there are less numbers to total in calculating an overall Leveled Time.

(continued on next page)

8.2.4 Labor Standards

(continued)

Leveled Time
(continued)

In **Work Sampling**, industrial engineers estimate the proportion of time spent on by one or more persons or machines on a given activity. This is useful for jobs with irregular components that vary in the amount of time per unit of output. Among the steps in work sampling:

- Identify and define activities involved in the work (through discussions with the workers and preliminary observations)
- Develop the method(s) for observing and recording activities
- Determine the sampling strategy (e.g., stratified or unstratified) and number of observations (by time and place)
- Select and train observers
- Record observed activities during each period
- Consolidate and analyze the data
- Convert the proportion of time spent on the activity into a Leveled Time for the activity

Other techniques for estimating Leveled Times include (but are not limited to) time lapse photography, simulations, worker surveys (e.g., ask workers to check the tasks they perform and rate relative time spent on each), juries of experts, and delphi techniques.

PF&D
Allowance

Estimators add the Personal, Fatigue, and Delay (PF&D) allowance to Leveled Times. The Personal allowance considers time for a worker to take care of personal needs, such as trips to the rest room and drinking fountain. The Fatigue allowance considers time to recuperate from fatigue related to factors such as general working conditions, the nature of the work, and the health of the worker. The Delay allowance covers unavoidable, predictable, and nonpredictable delays for such activities as replenishing materials, rejecting nonstandard parts, making minor equipment repairs, and receiving instructions. The Delay allowance should not include time for rework or repair of substandard parts.

Special
Allowances

Special allowances may also be added to cover delays not included in the personal, fatigue, and delay allowance. Normally these are delays that do not occur every work cycle, but occur periodically. Examples might include cleaning and oiling machines or cleaning the work area. Special allowances are first determined as minutes and then converted to a percentage. When use of a special allowance is appropriate, offerors usually calculate and apply the allowance as a percentage of the sum of the leveled time and the PF&D allowance. In analysis, care must be taken to assure that these allowances are reasonable and do not duplicate other allowances.

8.2.4 Labor Standards

(continued)

**Realization
and Efficiency
Factors**

Standards represent goals of efficient production. Production on the plant floor is rarely completed in the allowed standard time. In preparing proposals, the difference between the standard time and actual time is considered using a realization or efficiency factor.

Realization Factor. A realization factor will normally be calculated from historical data as:

$$\text{Realization Factor} = \frac{\text{Total Actual Hours}}{\text{Standard Hours}}$$

Analysis may be confused by the fact that some firms call this calculation an efficiency factor.

In a realization factor calculation, total actual hours include all manufacturing touch labor hours (reconcilable to payroll hours) associated with the tasks represented by the standard hours in the denominator, including “lost time” or “idle time” accounts and “off standard” or “unmeasured” work.

For example, a task has a standard of 1.5 hours. Actual time to perform the task 100 times is 300 hours. The realization factor would be calculated as follows:

$$\text{Realization Factor} = \frac{\text{Total Actual Hours}}{\text{Standard Hours}}$$

$$\text{Realization Factor} = \frac{300 \text{ Actual Hours}}{1.5 \text{ Standard Hours} * 100 \text{ Repetitions}}$$

$$\text{Realization Factor} = \frac{300}{150}$$

$$\text{Realization Factor} = 2.00$$

An estimate on the time to produce 50 units would be calculated as:

Estimate =		Standard Hours	*	Repetitions	*
Realization					
	for the task			Factor	
Estimate =	1.5	*	50	*	2.00
Estimate =	150 Hours				

(continued on next page)

8.2.4 Labor Standards

(continued)

Realization
and Efficiency
Factors

(continued)

Efficiency Factor. In an efficiency factor, the “operator” efficiency is measured against standard. The factor is normally calculated:

$$\text{Efficiency Factor} = \frac{\text{Standard Hours}}{\text{Actual Hours}} * 100$$

In an efficiency factor, idle time and off standard work are not considered. As a result, the reciprocal of the efficiency factor is usually less than the realization factor.

Example. A task has a standard of 2.0 hours. Actual time to perform the task 100 times is 400 hours. The realization factor would be calculated as follows:

$$\text{Efficiency Factor} = \frac{\text{Standard Hours}}{\text{Actual Hours}}$$

$$\text{Efficiency Factor} = \frac{2.0 \text{ Standard Hours} * 100 \text{ Repetitions}}{400 \text{ Actual Hours}} * 100$$

$$\text{Efficiency Factor} = \frac{200}{400} * 100$$

$$\text{Efficiency Factor} = 50.0 \text{ Percent}$$

An estimate on the time to produce 50 units would be calculated as:

$$\text{Estimate Factor} = \frac{\text{Standard Hours} * \text{Repetitions for the Task}}{\text{Efficiency Factor}}$$

$$\text{Estimate Factor} = \frac{2.0 * 50}{.50}$$

$$\text{Estimate Factor} = 200 \text{ Hours}$$

(continued on next page)

8.2.4 Labor Standards

(continued)

Estimate Analysis

Estimate analysis should consider both the standard and the realization or efficiency factor. The assistance of technical personnel familiar with operational methods and standards development is often invaluable. The following are among the issues to raise.

- ***Is the offeror using available standards and realization or efficiency factors to estimate contract cost?***

If the offeror has reliable standards and variance analysis programs as work measurement tools, every effort should be made to ensure their use as the primary basis of offeror estimates. If MIL-STD-1567A is included in the solicitation or contract, then the offeror is obligated to use and provide labor standard information in their estimates. If MIL-STD-1567A is not in the solicitation or contract but the same or similar products are subject to the standard on other contracts, the information would constitute cost or pricing data and should be provided to you.

- ***Were standards developed using appropriate process analysis and accepted methods of standard development?***

Many firms refer to historical costs as standards. Using historical costs does not provide the methods analysis and engineering discipline normally associated with the use of labor standards in estimating.

- ***Are realization or efficiency factors based on experience with the same or similar products?***

In a cost proposal, either factor should be based on experience with the same product or similar products.

- ***Are standards and factors current?***

The data used to develop standards should be current and representative of current methods, facilities, and working conditions. Efficiency factors should be based on the most recent experience. If you have questions or concerns, seek assistance from Government technical and audit representatives.

(continued on next page)

8.2.4 Labor Standards

(continued)

Estimate
Analysis
(continued)

-
- ***What efforts are being taken to control variance from labor standards?***

Reasons for the differences between the standard hours and actual hours should be explained. Improvement curves are often used to estimate the reduction of variances from standard as production continues. Setting and achieving aggressive goals for improvement of realization or efficiency factors beyond historical improvement curve effects should be a prime factor in reviewing contractor performance.

- ***How are rework and repair considered in the estimate?***

Rework and repair occurs when a part or assembly is rejected in an inspection or test and sent back for correction of the deficiency. In addition, some completed parts and assemblies must be reworked to incorporate design changes. The cost of rework should not be included in the labor standard, related allowances, or the realization factor. Instead, time spent on rework should be accounted for separately. However, labor standards can be used in estimating the labor effort required for rework. You should carefully screen historical rework costs to eliminate rework costs associated with one-time problems or changes.

(continued on next page)

8.2.4 Labor Standards

(continued)

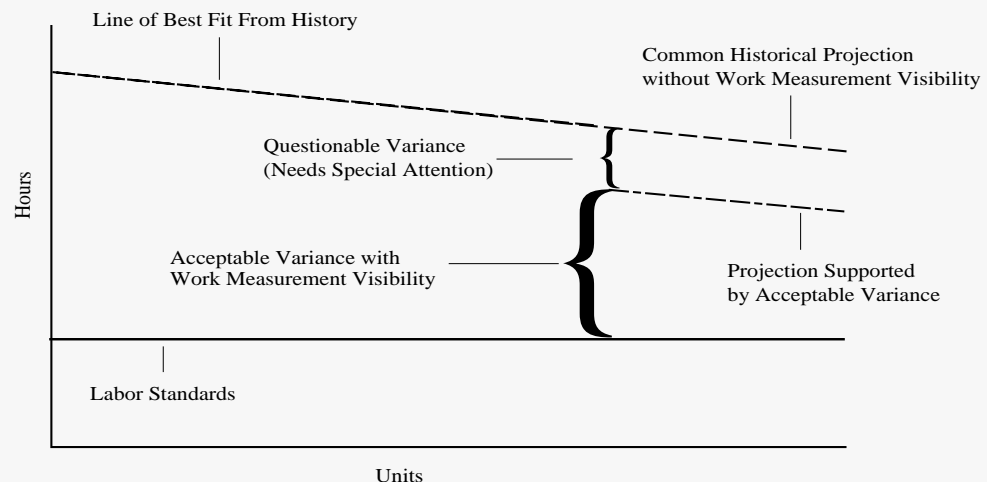
Labor Standards as Should-Cost Tools

Labor standards provide information necessary to apply should-cost principles to all proposals on a continuing basis. Using labor standards, you can identify and isolate costs related to inefficient or ineffective labor effort. Without standards, you are left with projections based on historical cost trends.

The log-log graph below presents a “line-of-best-fit” of actual labor-hour history. The graph also depicts (1) labor standard hours for the effort, (2) a labor-hour projection based on “acceptable variance” from standard, and (3) “questionable variance” from the labor-hour standard. The vertical distance between the labor-hour history and the labor standard represents difference between actual labor hours and the standard. To calculate a realization factor, divide historical hours by the standard hours.

Note that the “line-of-best-fit” follows the form of the improvement curve discussed in the previous section. Without labor standards, you would likely project the improvement curve to estimate the labor hours required to produce future units.

Labor standards provide a measure of the labor hours that should be required to complete the contract effort. The technical reviewer should explain his or her reasons for calling part of the variance “acceptable” and the rest “questionable.” To the extent that variance from standard hours is “acceptable”, include those hours in developing your prenegotiation objective on direct labor costs. To the extent that the variance has resulted from inefficiency or ineffectiveness, eliminate the associated labor hours from your prenegotiation objective.



8.3 ANALYZE WAGE RATE

Overview

Overview	<p>This section covers the analysis of the wage rate proposed by the offeror. Four general factors are examined:</p> <ul style="list-style-type: none">• how geographical location influences the wage rate and the laws governing the effort• variations in skill levels and the influence of various skill levels• influence of the time period of the labor requirement• effect of the conditions in the work force on wage rate
----------	--

Maps in This Section	<p>In this section are the following maps:</p> <ul style="list-style-type: none">• Wage Rate Analysis• Geographical Location• Variations in Skill• Time Period of the Labor Requirement• Conditions in the Work Force
----------------------	---

8.3.1 Wage Rate Analysis

Introduction

After establishing your prenegotiation position on labor hour requirements, you must consider the wage rate. The method a contractor uses to project wage rates should be developed and applied consistently to all estimates. Any special approach devised for a given, individual estimate should be examined with considerable care.

If the offeror and the cognizant Administrative Contracting Officer have negotiated an agreement on Forward Pricing Wage Rates, the offeror's proposal should identify the agreement and use the agreed to rates. If an agreement exists, you should honor it. If you feel the rates are incorrect or have information that could cause a change in the negotiated rates, contact the cognizant Administrative Contracting Officer and request a review of the negotiated rates.

Ordinarily, when audit support is available and a Forward Pricing Wage Rate Agreement does not exist, labor rate information will be provided by the auditor. When an auditor does perform the analysis, you must know what factors were considered in performing that analysis. When audit support is not available, you may be required to perform the analysis yourself.

FAR 31.205-6

Rates **MUST** be reasonable for the skills involved and geographic locale. Do **NOT** assume the reasonableness of the contractor's labor policies and compensation practices, even if governed by a labor-management

FAR 22.101-2

agreement. Instead, compare proposed wage rates for the most critical skills with wages paid for comparable types of labor by other firms of the same size, industry, and/or locality. In particular, try to compare proposed wage rates against those of firms that predominantly do non-government work.

Factors Influencing Wage Rate Analysis

Four general factors have a significant impact on labor rates. These are variations in:

- geographical locations
- skill levels
- time period of the contract
- conditions in the contractor's work force

The task of the analyst is to ensure that estimated wage rates are those that will actually be paid and that they are fair and reasonable.

8.3.2 Geographical Location

Introduction

Wage rates for the same work vary widely with geographical location. This variation results from the supply and demand position in relation to a particular trade, the strength of the individual trade organizations, the cost of living in the area, and other related factors. It is important, therefore, to ensure that the wage rate stated in the proposal is the one which applies in the location in which the work will actually be performed.

Information on wage rates paid to different trades in different locations is published by the Bureau of Labor Statistics and by various state and local agencies. The first action of the buyer should be to compare the wage rates proposed by the contractor with those given in the published tables. Differences should be explained and justified by the contractor, or the rates should be adjusted.

Labor Law Requirements

FAR 22.1002

Service Contract Act. The Service Contract Act applies to service contracts in excess of \$2,500. Under this act, the contractor is required to pay wages and fringe benefits at least at the level found by the Department of Labor to prevail in the locality, or in the absence of a wage determination, the minimum wage set forth in the Fair Labor Standards Act. Since the wage determination is based on the prevailing rates in the locality, significant differences above the wage determination should be explained and justified by the contractor, or the rates should be adjusted.

FAR 22.1002-3

Successor contractors performing on contracts for substantially the same or similar services in the same locality must pay wages and fringe benefits at least equal to those contained in any bona fide collective bargaining agreement entered into under the predecessor. This requirement will not apply if the Secretary of Labor determines that wages and fringe benefits are substantially at variance with the prevailing wages and benefits in the area or that they have not been reached as a result of arm's length negotiation.

FAR 22.403-1

Davis-Bacon Act. The Davis-Bacon Act applies to construction contracts over \$2,000 in value, and requires that workers be paid at least at the prevailing wage rate in the area as determined by the Secretary of Labor. Again, since the wage determination is based on the prevailing rates in the locality, significant differences above the wage determination should be explained and justified by the contractor, or the rates should be adjusted.

(continued on next page)

8.3.2 Geographical Location

(continued)

Labor Law
Requirements
(continued)

FAR 22.11

Office of Federal Procurement Policy Letter No. 78-2, March 29, 1978, “Preventing Wage Busting for Professionals”.

When competing for negotiated service contracts exceeding \$500,000, this letter requires offerors to submit total compensation plans (salaries and fringe benefits) for professional employees who will work on the contract. Offerors must include the data used in establishing the total compensation structure, such as recognized national and regional compensation surveys and studies of professional, public and private organizations. While the purpose of this requirement is to detect unrealistically low compensation, the data can also be used to validate the reasonableness of proposed professional wage rates.

FAR 22.602

Walsh-Healey Public Contract Act. The Walsh-Healey Act applies to contracts for the manufacture or furnishing of materials, supplies, articles, and equipment in excess of \$10,000 and requires that all workers (except for identified exempt employees) must be paid at least at the prevailing minimum wage rate. Special care must be exercised in pricing related contracts because there is no official Government position on the prevailing wage rate in various geographical areas.

DCAA
Compensation
Reviews

If the offeror performs work on large defense contracts, the DCAA will have performed a periodic compensation review. The results of these reviews can be very useful in evaluating the reasonableness of proposed wage rates.

Index
Comparisons

The Bureau of Labor Statistics, Department of Labor, publishes several documents that may be useful to you in reviewing wage levels.

Consumer Price Index. The Consumer Price Index is probably the best known. In addition to being the Nation's market basket measure, it is often used as an inflation adjustment on wage rates.

Area Wage Surveys. One of the most pertinent documents is the Area Wage Surveys. The Area Wage Surveys provide wage information on a variety of labor classifications in 70 major metropolitan areas. Survey information is customarily used in Government compensation surveys.

8.3.3 Variations in Skill

Introduction

When pricing proposals, the offeror may find it impractical, if not impossible, to identify each individual and his/her wage rate. Hence, offerors often lump similar job classifications together and establish a composite rate representative of all the workers in the class. Two points in the analysis of variations in skill are: the calculation of weighted average labor rates and the use of contract vs. plant-wide averages in estimating.

Weighted Average Labor Rate

The weighted average rate takes into account the rate and the number of workers in each labor category covered by the rate. A simple average of the wage rates can distort the wage value.

Consider the following example. The offeror has three levels of labor covered under a single rate: senior engineer, intermediate engineer, and entry-level engineer. The following table develops a composite wage rate both as a simple average and as a weighted average.

ENGINEERING LABOR CATEGORY	ENGINEERS EMPLOYED	WAGE RATE PER HOUR (\$)	WEIGHTED AVERAGE RATE
Senior	100	\$37.50	\$3,750.00
Intermediate	200	\$31.00	\$6,200.00
Entry-Level	300	\$29.95	\$8,985.00
Total Work Force	600		
Total of Wage Rates		\$98.45	
Total of Work Force X Rate			\$18,935.00
Weighted Average Wage Rate = $\$18,935.00 \div 600 = \31.56			
Simple Average Wage Rate = $\$98.45 \div 3 = \32.82			

(continued on next page)

8.3.3 Variations in Skill

(continued)

Weighted
Average Labor
Rate
(continued)

If all 600 engineers work on Government contracts, using the simple average rate of \$32.82, you would estimate contract costs at \$756.00 over actual cost for each hour the 600 employees work, or \$30,240.00 per week plus any overhead applied to direct engineering labor costs.

CAS 418.50(a)(ii)

When dealing with weighted average rates, there are a few general guidelines to keep in mind. First, CAS 418 specifically requires that average wage rates be either:

- For similar job categories where the workers in the different categories are interchangeable with respect to the functions performed, or,
- Where the job categories are not similar in function, the employees involved either all work in a single production unit or perform their respective functions as an integral team.

The other guideline deals with equitable distribution. Any average rate is going to be different than a rate discretely identified to a proposal. However, the variation should be minor and not effectively shift cost from one product or customer to another. For example, an offeror has two departments each with its own weighted average wage rate. Each department serves a different customer. The offeror has elected for pricing purposes to combine the weighted average wage rates of the two departments into a single rate.

(continued on next page)

8.3.3 Variations in Skill

(continued)

Weighted
Average Labor
Rate

(continued)

The following table shows both the old individual department rates and the new combined rate.

ENGINEERING LABOR CATEGORY	ENGINEERS EMPLOYED	WAGE RATE PER HOUR (\$)	WEIGHTED AVERAGE RATE
Senior	100	\$37.50	\$3,750.00
Intermediate	200	\$31.00	\$6,200.00
Entry-Level	300	\$29.95	\$8,985.00
Total Dept A Work Force	600		
Total of Wage Rates		\$98.45	
Total of Work Force X Rate			\$18,935.00
Weighted Average Wage Rate Dept A = $\$18,935.00 \div 600 = \31.56			
Senior	200	\$43.50	\$8,700.00
Intermediate	250	\$38.00	\$9,500.00
Entry-Level	275	\$30.00	\$8,250.00
Total Dept B Work Force	725		
Total of Wage Rates		\$111.50	
Total of Work Force X Rate			\$26,450.00
Weighted Average Wage Rate Dept B = $\$26,450.00 \div 725 = \36.48			
Weighted Average of Dept A & B combined: $(\$18,935 + \$26,450) \div (600 + 725) = \34.25			

(continued on next page)

8.3.3 Variations in Skill

(continued)

Weighted
Average Labor
Rate

(continued)

The net impact of the new combined rate would be to overcharge for Department A and undercharge for Department B.

	DEPARTMENT RATES	COMBINED RATE	OVER/UNDER CHARGE
DEPT A	\$31.56	\$34.25	\$2.69 Overcharge
DEPT B	\$36.48	\$34.25	\$2.23 Undercharge

By effectively shifting proposed cost from one department to the other, the offeror can favor one customer over another or shift cost from one contract type to another. If Dept B's work was awarded on competitive bid while Dept A's work was negotiated sole-source, the offeror can make Dept B *appear* more price competitive by subsidizing wages with dollars from Dept A.

If a question should come up on the appropriateness of the way a weighted average wage was derived, contact the responsible government auditor.

Contract vs.
Plant-Wide
Averages

Whether to use a rate based on the specific individuals working on your contract or a plant-wide average is a relatively easy question to answer. You use the one that is used for all other proposals. In other words, both you and the offeror **MUST** be **CONSISTENT**! Neither party should “cherry pick” the other by using the specific contract rate or the plant-wide average, whichever is most favorable. The offeror's estimating procedures should clearly spell out how wage rates should be applied. Further, the responsible government auditor and government pricing personnel routinely check for this type of problem while performing their analyses.

If the offeror estimates using plant-wide average rates but the work performed on your contract is substantially different than the other work performed by the offeror, the skill mix required on your contract may be substantially different. If the work to be done for your contract is different than other work performed by the offeror, you may need to encourage the offeror to change the method used in wage rate estimating.

8.3.4 Time Period of the Labor Requirement

Introduction	<p>Unless the proposed work is going to be completed within a few days of the contract award, the time period or periods when work will be performed become very important. Remember, the objective of your analysis is to, as closely as possible, determine what the labor costs will actually be. Two major areas of concern are labor loading schedules and wage rate trend analysis.</p>
Labor Loading Schedules	<p>The labor loading schedule, or the period(s) when labor will be used in contract performance, determines what wage rates should be used in contract pricing—<i>NOT the scheduled product delivery date</i>. Since wage rates tend to increase over time — due to general wage increases and cost of living adjustments — the further out in the future the work is scheduled, generally the higher the wage rates.</p> <p>The offeror's labor rate proposal should conform to the offeror's accounting and estimating practices. The offeror may estimate the contract labor hours to be worked in each fiscal year and multiply those hours by a projected annual rate. Alternatively, the offeror may propose the contract labor hours to be worked in each month of performance, multiply that rate by the effort in that month, and add all the monthly labor costs. Either method is acceptable.</p> <p>In either case, if contract work is scheduled over more than one period, the wage rates applied should reflect the projected wage rates for the period when the work will be performed.</p>

(continued on next page)

8.3.4 Time Period of the Labor Requirement

(continued)

**Labor Loading
Schedules**

(continued)

Example:

PERFORMANCE PERIOD (YEAR)	HOURS REQUIRED	HOURLY WAGE RATE	LABOR COST
19X1	5,000	\$10.38	\$51,900.00
19X2	5,000	\$10.99	\$54,950.00
TOTALS	10,000		\$106,850.00

If the calculation were done simply on the year of delivery, the calculation would look like this:

DELIVERY PERIOD	HOURS REQUIRED	HOURLY WAGE RATE	LABOR COST
19X2	10,000	\$10.99	\$109,900.00

As you can see, if you use the year of delivery rather than the periods in which performance will be taking place, the proposal is overstated by \$3,050.00. Government technical personnel can be very helpful in determining the labor loading schedule necessary to complete contract performance on schedule.

**Trend
Analysis**

Wage rate increases usually follow a trend over time. As mentioned earlier, wages are affected by cost of living and general wage increases. Suppose that you have three years of wage rate data and you are trying to evaluate the proposed wage rate for the current year and next year. The table below depicts the actual and proposed wage rate changes for 19X4 to 19X6 and the proposed wage rate changes for 19X7 and 19X8. The 19X4 Base Wage, \$8.75, is the actual wage rate for 19X3, a rate considered reasonable by the Government. The General Wage Increase (GWI) and the Cost of Living Allowance (COLA) are summed and multiplied by the Base Wage Rate to produce a total increase 5 percent in 19X4 to raise the actual rate to \$9.19. The contractor's Forward Price Wage Rate for 19X4 was \$9.24.

(continued on next page)

8.3.4 Time Period of the Labor Requirement

(continued)

Trend Analysis

(continued)

YEAR	BASE WAGE	GENERAL WAGE INCREASE	COST OF LIVING ALLOWANCE (COLA)	ACTUAL WAGE RATE	FORWARD PRICING WAGE RATE
19X4	\$8.75	2.0%	3.0%	\$9.19	\$9.24
19X5	\$9.19	2.0%	3.5%	\$9.69	\$9.72
19X6	\$9.69	2.0%	4.0%	\$10.27	\$10.33
19X7					\$10.94
19X8					\$11.50

As a buyer, you must determine if the proposed wage rates are reasonable. There are two methods of trend analysis commonly used to analyze proposed wage rates: detailed component analysis and line-of-best-fit analysis.

Detailed Component Analysis. The most accurate approach to analysis is to gather information about the components of the wage rate. For example, this contractor had a labor contract which expired at the end of 19X6. That contract called for a 2.0 percent GWI each year and a COLA based on changes in the Consumer Price Index (CPI). No agreement has been reached on a new contract, but most Government officials believe that the financial terms similar to the last contract would be reasonable. Based on that information you can build an estimate of what the forward pricing rate should be, as shown in the following table.

YEAR	BASE WAGE	GENERAL WAGE INCREASE	COST OF LIVING ALLOWANCE (COLA)	ACTUAL WAGE RATE	FORWARD PRICING WAGE RATE
19X7	\$10.27	2.0% ¹	3.5% ²	\$10.83 ³	\$10.94
19X8	\$10.84	2.0% ¹	3.2% ²	\$11.39 ³	\$11.50
¹ Projected GWI based on historical experience ² Projected CPI increases based on DRI ³ Estimate Wage Rate					

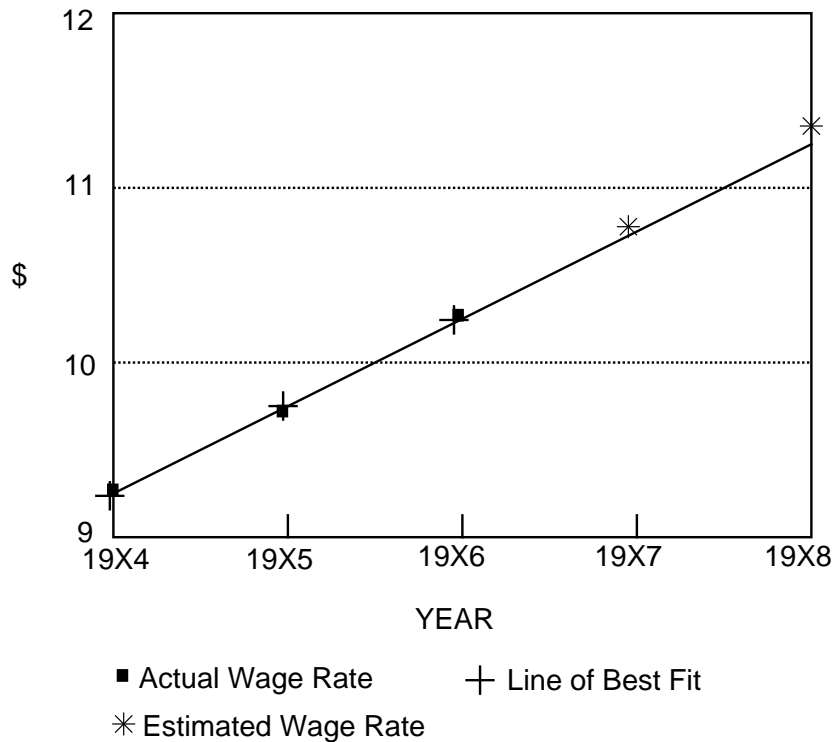
Based on the detailed analysis the proposed rates for both years appear to be high by about ten cents.

8.3.4 Time Period of the Labor Requirement

(continued)

Line-of-Best-Fit

A trend analysis technique, such as line-of-best-fit, can be used to estimate future wage rates based on the labor rate history. This technique is particularly useful when detailed data on wage rate components is not available or the dollar value of the purchase does not warrant the cost of a detailed component analysis. The graph below provides an example.



The graph like the detailed analysis indicates that the proposed wage rates are high by approximately \$.10.

8.3.5 Conditions in the Work Force

Introduction	<p>While analysis of trends can be relatively easy and often very useful, there are factors that can disrupt wage rate trends. Three such factors are discussed below. Two major factors that must be considered are wage rate projections are hiring and firing in the plant and production method changes.</p>
Hiring or Firing in the Plant	<p>Hiring or firing in the plant can be thought of as any major change in the aggregate demographic make up of the work force. Major layoffs, early retirement options, major recalls, and large new numbers of new hires are examples of work force changes that can impact wage rates.</p> <p>In the case of layoffs, since force reductions are typically accomplished considering seniority, the new lower paid employees are usually the first to go with the more senior higher paid employees staying on. The result is a large increase in average wage rates.</p> <p>In the case of early retirements, with higher paid senior employees leaving, the wage rates would drop. The average wage rate would also drop if the firm recalls workers or hires large numbers of entry level trainees, thanks to the greater number of employees at the lower end of the pay structure.</p>
Production Method Changes	<p>Production method changes can have a disruptive effect on wage rates by shifting the number of employees in different skill levels and by eliminating or adding whole job categories. For example, the introduction of computer aided manufacturing technology could significantly reduce the number of higher cost toolmakers while increasing the number of lower cost machinists in the plant. If the offeror is projecting major changes in manufacturing methods, you should, with the help of government technical personnel, look at the potential ramifications of the change on the work force.</p>
Overtime and Shift Premiums	<p>Whenever possible, ascertain the extent that offers are based on payment of overtime or on shift premiums. Do NOT negotiate prices that include these costs unless the overtime or shift premiums are necessary for timely contract completion. Simply stated, the Government requirement MUST necessitate the need for premium charges. On the other hand, if the offeror is proposing overtime to compensate for poor scheduling, Government recognition of the overtime costs is clearly NOT reasonable.</p>

FAR 22.103

(continued on next page)

8.3.5 Conditions in the Work Force (Continued)

Uncompensated Overtime

Uncompensated overtime means unpaid hours worked in excess of an average 40 hours per week by an employee who is exempt from requirements of the Fair Labor Standards Act. Many service firms encourage or even require FLSA-exempt employees to work a 45 to 80 hour week — while paying them for only 40 hours.

When evaluating estimated labor costs, your concern is how the offeror accounts for uncompensated overtime. Firms do not necessarily treat uncompensated hours in the same way.

Some firms distribute labor costs only to cost objectives worked during the first eight hours of the work day. Others permit employees to select the cost objectives to be charged for excess hours. Either method provides the firm with an opportunity to game the allocation of labor costs and related indirect costs.

Other contractors require their employees to charge for every hour worked — compensated or not. This is known as "total time accounting". The Defense Contract Audit Agency (DCAA), among others, contends that total time accounting is required for compliance with FAR 31.201-4, CAS 401, and CAS 418.

When evaluating proposals, such differences in accounting practices can be troublesome. For example, when competing for a fixed price contract, Firm A may be able to offer a lower price than Firm B because Firm A plans to have its professionals work many hours of uncompensated time against your contract (while charging much of their compensated time to other, sole source, cost reimbursement contracts).

DFARS
215.608

Because of such problems, the Department of Defense (DoD) and other agencies prescribe special clauses and provisions for some service contract solicitations contracts, such as a requirement that an offeror's practices for estimating uncompensated overtime be consistent with its cost accounting practices for accumulating and reporting uncompensated overtime.

When evaluating the realism of proposed costs (see Chapter 14), be alert for proposed hours that seem well below levels required for performance. The reason may be that the firm's estimates reflect only compensated hours — not the uncompensated overtime customarily worked by its employees. If a firm expects its employees to devote many hours of uncompensated time to your contract, consider the associated risks to the Government — such as whether the offeror's expectations are realistic.

End-of-Chapter Vignette

Andrew is really confused on manufacturing and engineering labor. REMEMBER! Kay asked you to help out the new guy, and she's the boss!

- 1. The manufacturing labor hour history appears to demonstrate an improvement trend. Is it reasonable to apply improvement curve theory to manufacturing labor? Why?*

- 2. Is it reasonable for the technical report to apply should-cost analysis to fabrication labor? Why?*

- 3. What are the actual assembly labor hours per unit for each of the first four lots?*

- 4. Using the improvement curve, what assembly hours per unit and total assembly hours would you project for lot 6?*

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

5. *Which set of labor rates would you use in preparing your objective (proposal, audit, FPRA)? Why?*

6. *WEC proposed engineering labor using a percentage of manufacturing hours and a wage rate based on an estimate of the need to raise wages to attract qualified personnel. What are the bases of the audit and technical exceptions to this proposal?*

7. *The technical report recommended -0- hour in 19X8. What is the basis of this recommendation? Is it reasonable?*

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

Complete the following table showing the proposed costs, recommended costs from the various reports attached to the proposal, and your judgement on what your cost objective should be. Briefly explain your rationale for your objective and provide paragraph references to the reports you used.

Direct Labor Summary Table

LABOR COST	PROP	AUDIT	TECH. REPORT	ACO REPORT	YOUR OBJECTIVE
Mfg Hours 19X8					
Mfg Hours 19X9					
Mfg Wage Rate 19X8					
Mfg Wage Rate 19X9					
Eng Hours 19X8					
Eng Hours 19X9					
Eng Wage Rate 19X8					
Eng Wage Rate 19X9					

(Document the rationale for your objectives on the next page)

Rationale for position on Mfg hours:

Rationale for position on Mfg wage rates

Rational for position on Eng hours:

Rational for position on Eng wage rates:

Chapter Vignette

***Direct Costs
Other Than Direct Material Labor***

Other direct costs? Doesn't direct material and direct labor cover everything?

"Read on, Andrew, you will see that there are some costs that do not fit in direct material or labor. These costs can, sometimes, be a problem if they look like they are covered in other categories of cost", said Kay.

Andrew had found that studying his training materials and then reviewing the reports worked pretty well.

Course Learning Objectives

At the end of this lesson, you will be able to identify other direct costs

Chapter Overview

Overview

This chapter covers:

- the concept of Other Direct Costs
 - seven of the most commonly proposed Other Direct Costs
 - how to analyze each of these Other Direct Costs
 - special concerns of Other Direct Costs that you must take into consideration
-

Maps in This Chapter

This chapter contains the following maps:

9.1	TYPES OF OTHER DIRECT COSTS.....	9-4
9.1.1	Other Direct Costs.....	9-5
9.1.2	Travel.....	9-6
9.1.3	Consultants and Contract Labor.....	9-9
9.1.4	Preproduction Costs.....	9-11
9.1.5	Special Tooling and Test Equipment.....	9-15
9.1.6	Computer Time and Printing.....	9-19
9.1.7	Federal Excise Tax.....	9-21
9.1.8	Royalties	9-23
9.2	SPECIAL ESTIMATING CONCERNS	9-25
9.2.1	Special Estimating Concerns.....	9-26

9.1 Types of Other Direct Costs

Section Overview

Overview	This section discusses costs that may be classified as direct costs depending on the situation. Seven types of costs that are most commonly proposed as other direct costs are covered and procedures for analyzing each are given.
----------	---

Maps in This Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Travel• Consultants and Contract Labor• Preproduction Costs• Special Tooling and Test Equipment• Computer Time• Federal Excise Taxes• Royalties
----------------------	--

9.1.1 Other Direct Costs

Identifying Other Direct Costs

FAR Table 15-2 describes other direct costs (ODCs) as costs NOT previously identified as direct material, direct labor, or indirect cost. Examples of the types of cost that are commonly proposed as ODCs include: preproduction costs, special tooling and test equipment, computer time, federal excise taxes, royalties, travel, and contract labor.

As you can see from the above list, ODCs can be costs that are normally treated as indirect costs or costs that are normally treated as direct costs. Typically, costs identified as ODCs are treated differently for one of two reasons:

1. the magnitude of the cost in comparison with similar costs in the other business of the firm
2. the unique circumstances surrounding incurrence of the cost under the contract.

Most often, ODCs are costs that under normal circumstances are charged as indirect costs. Special treatment might be required when costs are much greater than the amounts normally incurred for a particular type of expenditure. Unusually high and one-time costs would temporarily distort the overhead account and have an adverse effect on the rest of the firm's operations, particularly its backlog of fixed-price business and the products that it sells competitively.

9.1.2 Travel

Introduction	Dollar for dollar, estimates of travel cost attract more attention than any other element of most cost proposals. Interest continues to increase in this age when travel costs are rapidly increasing and alternative means of communication, such as teleconferencing, are becoming more common place.
--------------	---

Analysis	<p>Step 1. Determine whether the proposed travel should be a direct or an indirect cost.</p> <p>As with many other types of ODC, travel can be categorized as either a direct or indirect cost. There are two major factors that determine how travel expenses should be charged: (1) the traveler and (2) the purpose of the travel.</p> <ul style="list-style-type: none">• <i>Who is traveling?</i> <p>Normally, if the traveler's wages are charged to an indirect labor account, the traveler's transportation and per diem expenses are indirect. If the traveler's wages are charged direct to a contract, then the traveler's transportation and per diem expenses for travel in connection with the contract are generally charged as a direct cost.</p> <ul style="list-style-type: none">• <i>What is the purpose of the travel?</i> <p>There are circumstances where the charges may “crossover” from direct to indirect or visa versa. If a direct charge employee is attending a course on Total Quality Management, the travel expenses might be charged against an indirect training account. Going the other way, if an indirect employee travels to a Government office to present a contractually required presentation, then the travel costs could be charged to the contract requiring the presentation.</p>
----------	---

(continued on next page)

9.1.2 Travel

(continued)

Analysis
(continued)

Step 2. Determine cost reasonableness

There are a number of questions that should be asked in determining the reasonableness of travel cost estimates.

- *Will the travel really occur?*

Sometimes, travel is proposed to meet a contractual requirement on the assumption that the contractor will send someone from the plant out to the specified location. If the contractor will have on-site field representatives who can fulfill the contractual requirement, question whether the travel cost is necessary.

Another common situation to watch out for is assignment of personnel to remote or undesirable locations. If the contract is for a field representative, the proposal may include cost to move the representative from the home location, pay per diem, and move the representative back home at the end of the contract. Sometimes, you will find that the field representative has been at the remote location for several years and has no intention of leaving! Don't accept the argument that the travel moneys are really additional compensation "to keep the reps happy". If the contractor wants to pay them additional money, the funds should be classified as compensation, NOT travel.

- *Can any trips be combined?*

A few long trips generally cost less than the equivalent number of days in travel if spread over a larger number of short trips.

- *Are you being double-billed for the same trip?*

Most firms can accomplish several tasks in one trip. If there is a separate travel estimate for each task, determine (1) whether the estimate is predicated on taking a separate trip for the task and (2) whether in fact the firm will be able to accomplish several of those tasks during the same trip.

(continued on next page)

9.1.2 Travel

(continued)

Analysis

(Step 2

continued)

-
- ***Is the proposed number of travelers reasonable?***

Many trips involve teams of travelers. The offeror **MUST** support the need for each traveler, as well as the need for the trip.

- ***Is the mode of transportation appropriate?***

This point is best explained with an example. The proposal is based on the employee flying to the destination on a commercial airline. In reality, the employee intends to take his family along and drive a company car. While taking the family along is the employee's personal decision (as long as the job gets done) and the company car may be an appropriate means of travel, the company car is paid for through overhead and the airline expense proposed as ODC will never occur. Obviously, the airline cost should NOT be in the proposal as ODC.

- ***Are the travel expenses in accordance with the FAR 31.205-46, Travel Costs, restrictions?***

FAR 31.205-46

Due to the high visibility of contractor travel while on Government business, the FAR restricts travel expenses to the same levels that would pertain to Government employees if they were to make the same trip. Remember, the cost principle sets a maximum limit on these expenses. The cost principle does NOT set a floor *below* which you cannot go. If travel rates are available to the contractor below those set in the Government travel regulations, you should use those rates as the most fair and reasonable available.

9.1.3 Consultants and Contract Labor

Introduction

Contract labor is work performed by other than contractor employees. The nature of the work may be the same as work performed by contractor employees or it may be totally unique. Direct contract labor should be separately identified in the proposal. Since contract laborers are NOT employed by the contractor, they are NOT eligible for employee benefits such as medical insurance and retirement.

Contract labor must be proposed separately from in-house labor. If the cost of contract labor is NOT separately identified, it will likely be combined with in-house labor as a base for labor-related overhead expense. Since the overhead rate includes the cost of benefits that contract laborers will NOT receive, application of that rate to contract labor will result in unreasonable overhead expense.

Analysis

Step 1. Determine if the proposed contract labor cost is reasonable.

- *Is the proposed cost reasonable in comparison with competitive sources?*

Generally, contract labor is purchased from a company specializing in providing personnel services. Sometimes known as “body shops”, these firms hire or contract with individuals to work for them and then contract out to firms requiring their services. Since there are usually many firms available to meet these manpower needs, the offeror can often support the reasonableness of contract labor costs by citing price competition.

- *Is the proposed cost reasonable in comparison with in-house labor expense?*

Another test of reasonableness could be a comparison of contract labor with the cost of full-time employees. If the cost of full-time employees is LESS THAN the cost of contract labor, then the amount recommended for negotiation would equal the amount you would recommend if regular contractor employees were performing the work.

(continued on next page)

9.1.3 Consultants and Contract Labor (continued)

Analysis
(continued)

Step 2. Determine if there is any duplication between in-house and contract labor efforts.

- *Is there a duplication of effort?*

For example, an offeror proposes using several contract quality assurance inspectors to travel to supplier locations to check product quality. During the analysis, the Government price analyst discovers that the contractor has proposed a substantial labor effort and travel for the firm's own supplier quality personnel to make the same vendor visits. The duplication must be eliminated to avoid paying for the same effort twice.

9.1.4 Preproduction Costs

Introduction

Preproduction costs, also known as start-up or non-recurring costs, are treated as ODCs by most offerors. These costs can be characterized as out of the ordinary costs associated with the initiation of production under a particular contract or program.

Examples include:

- preproduction engineering
- special tooling
- special plant rearrangement
- training programs
- initial rework or spoilage
- pilot production runs

Analysis

In analyzing preproduction costs, you should follow a three step procedure.

Step 1. Direct your initial efforts toward arriving at a mutual understanding with the offeror concerning identification of the types of costs that should properly be considered as preproduction costs.

For example, you may occasionally see proposal preparation costs listed as preproduction ODCs. Depending on the circumstances of the proposal preparation, these costs may or may not be allowable ODCs. At issue, here, is whether proposal preparation is a preproduction cost or an indirect bid & proposal cost. If a contract or contract modification existed and required proposal preparation, the offeror may have a valid argument for including the cost as ODC.

(continued on next page)

9.1.4 Preproduction Costs

(continued)

Analysis
(continued)

When there is a question about the allowability of such a cost, confer with the responsible government auditor and answer the following questions:

- ***Is this practice in accordance with the contractor's accounting practices?***

YES: If the practice of charging the cost as an ODC in specific circumstances and indirect in others is documented, and conforms with applicable Cost Accounting Standards and Generally Accepted Accounting Practices (GAAP), recognition may be acceptable.

NO: If such a practice is not documented, the cost should probably be classified as an indirect cost and NOT recognized as ODC. In the above example, the cost would be classified as an indirect bid and proposal cost if it did not qualify for ODC consideration.

- ***Do the offeror's indirect cost estimates used for overhead rate development specifically exclude this category of cost?***

YES: If this type of cost is specifically excluded from overhead pool estimation, the probability of you being charged twice, once in ODC and again in overhead, is reduced.

NO: If this type of cost is not specifically excluded, then it is reasonable to assume that you are already paying the cost through application of the appropriate overhead. In the example, you **WOULD NOT** accept proposal preparation as an ODC.

(continued on next page)

9.1.4 Preproduction Costs

(continued)

Analysis
(continued)

FAR 31.202 & 31.203

- *Are circumstances truly different or the costs extraordinary?*

YES: If the circumstances are truly different than those normally encountered, it is more likely that the charge will be acceptable as an ODC.

NO: If the circumstances are not different than those that would normally warrant charging the cost as an indirect cost, the cost should be charged in accordance with standard procedures. If, in the above example, the proposal was prepared in the absence of any specific contractual obligation requiring proposal preparation, the cost would be an indirect bid & proposal cost and NOT an ODC. If the offeror was under full or modified Cost Accounting Standards (CAS) coverage, estimating and charging this cost as an ODC would also be a CAS noncompliance under CAS 402.

Step 2. Next, you need to use appropriate techniques of cost analysis to analyze the reasonableness of proposed costs.

In most cases, preproduction costs will include a combination of material and labor. The techniques of analysis are the same as those described in previous sections for direct material and direct labor.

(continued on next page)

9.1.4 Preproduction Costs

(continued)

Analysis

(continued)

Step 3. With the offeror, determine if it would be appropriate to establish an agreement to defer costs in whole or in part to subsequent contracts.

There may be a sound reason for setting aside a portion of preproduction cost for allocation to later contracts. Any agreement to defer preproduction costs should be worked out carefully to assure that it does not result in an unintended advantage to the offeror. Once established, the agreement should be carefully documented and signed by both parties to preclude later misunderstanding.

Do NOT consider ODCs deferred from previous contracts without first substantiating that an agreement signed by a Government contracting officer exists and the proposed cost is in accordance with the agreement.

9.1.5 Special Tooling and Test Equipment

Introduction

Special tooling and test equipment are probably the most common preproduction costs proposed as ODCs. Costs for refurbishment and repair of special tooling and test equipment are often proposed as ODCs on follow-on contracts. As a result, these items merit special attention here.

Special Tooling

FAR 45.101

Special Tooling includes jigs, dies, fixtures, molds, patterns, taps, gauges, other equipment and manufacturing aids (along with all components of these items), which are of such a specialized nature that without substantial modification or alteration their use is limited to the development or production of particular supplies or the performance of particular services.

Special Test Equipment

FAR 45.101

Special Test Equipment includes single or multipurpose integrated test units engineered, designed, fabricated, or modified to accomplish special purpose testing in performing a contract. It consists of items or assemblies of equipment including standard or general purpose items of components that are interconnected and interdependent so as to become a new functional entity for special testing purposes.

(continued on next page)

9.1.5 Special Tooling and Test Equipment

(continued)

Analysis

Due to the complexity of the issues surrounding special tooling and test equipment, you may find it helpful to request assistance from government technical personnel, the contracting officer, and the property administrator. Their assistance will be invaluable in the recognition and analysis of special tooling and test equipment costs. The following steps will guide you in your cost analysis.

Step 1. Determine if the tooling or test equipment is “special.”

- *Is the proposed tooling or test equipment only usable on the proposed contract or is it general purpose (usable for other products/contracts)?*

YES: If the tooling or test equipment is usable only for your contract, then it may be properly charged as ODC.

NO: If the equipment is general purpose and can be used elsewhere, it should be capitalized and depreciated through the appropriate overhead account. Through the application of overhead rates each contract will receive its fair share of the depreciation expense. You should NOT accept any estimate as ODC.

- *Can the necessary task be performed at a lower total cost (equipment plus labor) with general purpose equipment?*

YES: Do NOT pay for special equipment when general purpose equipment can do the same job at lower total cost.

NO: If general purpose equipment will NOT do the job at a lower total cost, the cost of the special equipment should be considered further.

(continued on next page)

9.1.5 Special Tooling and Test Equipment (continued)

Analysis
(continued)

Step 2. Determine if the offeror has proposed the proper special tooling or test equipment for the task.

- ***Should the tooling be hard (high rate) or soft (low rate) tooling?***

This question really deals with total projected requirements. As such, you may need to look beyond the immediate proposal you are reviewing to determine the total Government need and assess the appropriate type of tooling. You will probably need technical assistance in making your analysis.

- ***Are the correct number of tools and test equipment proposed?***

This question deals with capacity. If the contract calls for a production rate of 100 units per month, and a single tool can only produce 50 per month, then additional capacity is needed. If the contract calls for production of 50 units a month and a single tool will produce 100, the expenditure may be excessive. Government technical personnel can be helpful in reviewing the capacity of proposed tooling, suggesting different tooling or approaches that can meet the contract requirements, or identifying existing tooling that could augment the proposed tooling and meet contractual requirements at reduced costs.

(continued on next page)

9.1.5 Special Tooling and Test Equipment (continued)

Analysis
(continued)

Step 3. Determine if satisfactory tooling or test equipment already exists.

- *Is there Government owned tooling and test equipment available that can be provided, or available on another contract the contractor is performing on, that can be used on a rent-free noninterference basis?*

YES: If Government owned tooling already exists, consider providing the tooling for contractor use rather than paying the contractor to acquire new tooling. If the tooling already exists on another contract, seek approval for use on your contract. The only restriction is that your use CANNOT interfere with use of the tooling or test equipment by the “owning” contract. Rent-free use on a noninterference basis between Government contracts is a normal and customary practice.

NO: If equipment is NOT available, you should further consider the cost of proposed special equipment.

- *Is there other similar tooling or test equipment already available that can do the job?*

YES: If similar tooling or test equipment exists that can do the job, you should NOT pay for unneeded new tooling. You may pay some usage or modification costs, but check with the responsible government auditor for the appropriate cost treatment before proceeding with your analysis.

NO: If tooling does NOT exist, you should further consider the proposed cost of the special equipment.

Step 4. When you have established the true requirement for special tooling or test equipment, proceed with your analysis of the proposed costs.

9.1.6 Computer Time

Introduction

Computer time is often allocated as a “service center.” A service center can charge its effort as a direct cost, an indirect cost, or as a stand alone contract. Before beginning your analysis, you need to determine if the computer usage on your proposal is being properly proposed in accordance with contractor practices and Generally Accepted Accounting Practices. The responsible government auditor can be helpful in establishing the appropriateness of the charges as ODCs.

Analysis

The following are some questions that you should consider when analyzing the reasonableness of computer charges:

- ***Is the amount of the proposed computer effort reasonable for the contract effort?***

If direct computerized effort is NOT required, you should NOT accept any part of the proposed ODC. If a lower effort is required, your analysis should reflect that adjustment.

- ***If the proposal is based on the use of the offeror's own computer service center, is the cost reasonable when compared to comparable services available through other sources?***

Answering this question often requires an analysis similar to the analysis required for any other organizational transfer. Many large companies have organized their computer operations as separate functions that “sell” to other parts of the company and may sell services outside the company. In this case, you want to pay a fair and reasonable price based on the market price of this type of service. If similar services are available at half the price proposed, then you should consider using the market price, NOT the proposed price.

(continued on next page)

9.1.6 Computer Time (continued)

Analysis
(continued)

- *Is the type of equipment currently in use consistent with the equipment used as a basis for estimating the proposed computer costs?*

If the proposed costs are based on current charges per minute of use and on historical “run-times” for similar work, you may be overpriced. Newer equipment and software may run the same job several times faster than the equipment in use at the time of the historical jobs used to estimate time.

- *Are the proposed costs based on the computer resources that will actually be used?*

This question is similar to the previous question, except that the emphasis here is on how the work will be performed rather than the data used to develop the estimate. The offeror may have the capability of doing the computer work through a central computer service center, contracting out the work, or running the work on minicomputers or even state-of-the-art personal computers located within the section that will use the computer outputs. Each of these options could lead to drastically different pricing results.

For example, if the work can be done on existing equipment within the engineering department, it is likely that NO ODC will be applicable to the contract because individual engineering work station computers are typically charged to overhead.

Printing

FAR 8.8

The Government Printing Office is the required source for Government printing. Hence, your agency may impose limits on the extent to which a contract can call for printing copies of material even when part of a larger requirement.

9.1.7 Federal Excise Taxes

Introduction

Federal excise taxes are levied on the sale or use of particular supplies or services. The most common excise taxes are:

- Manufacturer's excise taxes imposed on certain motor-vehicle articles, tires, and inner tubes, gasoline, lubricating oils, coal, fishing equipment, firearms, shells, and cartridges sold by manufacturers, producers or importers
- Special-fuels excise taxes imposed at the retail level on diesel fuel and special motor fuels.

Analysis

Analysis of proposed Federal excise tax expense should follow a three-step process.

Step 1. Determine what taxes are being proposed.

FAR 31.205-41

FAR 31.205-41 requires that taxes, such as Federal excise taxes, that must be paid by the contractor, are allowable costs. The offeror's proposal should contain a statement about whether or not the proposed price includes excise taxes. If excise taxes are included, the proposal should identify the amount of tax for each item.

(continued on next page)

9.1.7 Federal Excise Taxes

(continued)

Analysis
(continued)

Step 2. Determine if there are any tax exemptions that apply to your particular contracting situation.

Offerors can often obtain an exemption certificate for Federal excise tax.

Examples:

- No special-fuels excise taxes are imposed under many contracting situations.
- No communications excise taxes are imposed when the supplies and services are for the exclusive use of the United States.
- No highway vehicle use tax will be imposed when vehicles are owned or leased by the United States

If an exemption is available, the excise tax cost should be disallowed unless the contracting officer determines that pursuing the exemption outweighs the corresponding benefits accruing to the Government. Whenever excise taxes are included in an offeror's proposal, seek the advice of legal counsel about the propriety of the taxes.

FAR 31.205-41

Step 3. If the tax requirement CANNOT be waived, verify the tax calculations.

Assure that the offeror is applying the proper tax rate to the appropriate tax base.

9.1.8 Royalties

Introduction

Royalties are fees paid by the user to the owner of a right, such as a patented design or process. If royalties are proposed, the offeror should identify the name and address of the licensor, date of license agreement, patent numbers or patent application serial numbers, description of the patented item or process, and basis of payment.

Analysis

Step 1. Determine if the identified process or design is needed to complete the contract.

Technical assistance will normally be required to determine if the identified process or design is truly necessary to complete the contract.

Step 2. Determine if the proposed cost is supported by an appropriate license agreement.

Contractors generally pay royalties by virtue of license agreements. Many license agreements are NOT clear on their applicability to the items on the proposal. Unless the license agreement specifically identifies the items it covers, then the relationship to your proposal is NOT adequately established.

Step 3. Determine if the Government possesses a royalty-free license on the patent.

For example, Contractor A develops a patentable process while working on a Government contract. Contractor A patents the process and the Government has royalty-free use. Contractor B uses the patented process on a Government contract and proposes, as ODC, payment of royalties to Contractor A. In this case, no royalty payments are due since the Government has a royalty-free license. The royalty costs should be removed from the proposal.

(continued on next page)

9.1.8 Royalties (continued)

Analysis
(continued)

FAR 31.205-30
& 31.205-37

Step 4. Determine price reasonableness.

Probably the most difficult aspect of analyzing royalty fees is determining reasonableness. Unless there is another way of completing the contract without the use of the patent, there is no basis for market price comparison, although you can compare the estimate with any royalties that the offeror pays for similar commercial production. The price paid to the licensor is probably based on “what the market will bear.” You may have to base your decision on price reasonableness on your own subjective judgement, supported by technical review and information on the patent's importance in the production process.

9.2 Special Estimating Concerns

Section Overview

Overview	<p>This section covers several aspects of estimating other direct costs that you need to pay close attention to:</p> <ul style="list-style-type: none">• proper selection of costs as ODCs• duplication of costs in proposed effort• misapplication of rates and factors
Maps in This Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• Special Estimating Concerns

9.2.1 Special Estimating Concerns

Introduction	Due to the similarity of ODC with other types of direct and indirect costs, several special concerns arise in estimating these costs. The major concerns are proper selection of cost for proposing as ODC, potential duplication in proposed effort, and misapplication of rates and factors.
--------------	--

Selection of Costs Proposed as ODC	Since ODC costs are often the same as, or similar to, costs presented elsewhere in the proposal, special care MUST be taken to ensure that the costs identified as ODCs are truly unique and significant. If a cost is NOT , it probably should be considered using its more common estimating treatment.
------------------------------------	---

If the only rationale is that the usual rate is less than what discretely pricing the cost as ODC will yield, then the cost should **NOT** be considered as ODC. Ask yourself this question, would the contractor propose a cost as ODC because it is less than the cost the usual rate would yield? Generally, ODC costs can be directly tied to a performance requirement of the contract. If there is any question on the validity of classifying a cost as ODC, seek assistance from the responsible government auditor.

Potential Duplication in Proposed Effort	There are two common ways duplication of effort through ODC can occur: 1. The effort is proposed both as ODC and by use of its normal treatment as direct or indirect cost
--	---

2. Through the use of cost estimating relationships, the effort is proposed twice, once as ODC and again as a percentage or factor.

Estimate duplications may be difficult to detect.

For example, if a particular engineering effort is proposed as ODC, the corresponding duplication of effort by contractor engineers could be buried in the detailed support backing up the proposed direct engineering hours.

(continued on next page)

9.2.1 Special Estimating Concerns

(continued)

Potential
Duplication in
Proposed
Effort
(continued)

The creation of duplication through Cost Estimating Relationships can also be hard to detect. Computer usage can be proposed as ODC while computer usage is also proposed as a factor on engineering hours. It is possible that the ODC computer usage is extraordinary usage while the factor is routine usage. Only by digging into the supporting information on the two efforts can you determine if the ODC effort is included in the factor.

Misapplication
of Rates and
Factors

By their nature, costs proposed as ODCs are usually not subject to many common overhead allocations. ODC elements are often purchased, much as materials are, and should be subject only to a limited application of rates. Again, with the help of the responsible government auditor, you can identify what the appropriate account treatment should be.

If ODC costs are inadvertently mixed in with regular contractor costs, misapplication of both direct and indirect rates can occur. Misapplication can increase cost on your proposal and result in over-absorbed overhead rates across all contracts.

If the expense now proposed as ODC was originally part of the overhead expense projections used for developing overhead rates, it may be necessary to develop special overhead rates for application on your proposal. By adjusting the overhead rate, you avoid paying for the effort twice — once as ODC, and again as overhead. In extreme cases where the withdrawal of the ODC costs from the overhead pool significantly impacts the overhead rate, it may be necessary to adjust the overhead rate for all contracts.

End-of-Chapter Vignette

Now, this should be an easy one! Too bad everything Andrew brings to you isn't like this

- 1. Does WEC's proposed cost for field quality inspections appear to be properly classified as an Other Direct Cost? Why?*

- 2. WEC has agreed that the proposed field quality inspection costs were a mistake and should be removed from the proposal. If the mistake had not been discovered and the cost left in, could this have resulted in defective pricing (see Chapter 2)? Why?*

Chapter Vignette

Indirect Costs Are Important, Too.

Andrew came into Kay's office and sat down. "I thought I was getting the hang of this, but these indirect cost rates have me really confused! There are proposed rates, recommended rates, negotiated rates, and they seem to jump all over the place. I guess I'm overwhelmed by all the numbers; base numbers, pool numbers, the rates, and they are all projections of future costs."

"Indirect cost projections can be difficult to understand, especially here at the buying office where you do not have good access to contractor records," Kay said. "Besides understanding how rates are developed and applied, you need to gain an understanding of the overall environment that the rates represent. The rates reflect all the work the contractor is performing, not just the proposal you are working on."

Course Learning Objectives

At the end of this chapter, you will be able to:

1. Identify the importance and composition of indirect costs, along with guidelines for classifying an element of cost as direct or indirect
2. identify the elements, formulation, and calculation of indirect cost rates
3. describe the indirect cost allocation cycle
4. apply forward pricing rates in developing prenegotiation positions on indirect rates
5. Identify and explain issues in critiquing proposed forward pricing indirect rates

Chapter Overview

Overview

In this chapter, you will learn about:

- the importance and composition of indirect costs
 - how the costs are estimated and charged to specific contracts
 - how to calculate the indirect cost rates
 - how indirect costs are grouped into pools and charged to specific contracts
 - the indirect cost allocation cycle
 - how to analyze proposed indirect cost rates
 - the certification required for indirect cost rates
-

Maps in This Chapter

This chapter includes the following sections:

10.1 IMPORTANCE AND COMPOSITION OF INDIRECT COSTS	10-4
10.1.1 Importance and Composition of Indirect Costs	10-5
10.1.2 Direct/Indirect Cost Decision	10-8
10.2 INDIRECT COST RATES	10-10
10.2.1 Indirect Rate Formula	10-11
10.2.2 Indirect Cost Pools.....	10-12
10.2.3 Bases	10-16
10.2.4 Steps In Estimating Indirect Costs.....	10-18
10.3 INDIRECT COST ALLOCATION CYCLE.....	10-24
10.3.1 The Indirect Cost Allocation Cycle	10-25
10.3.2 Examples of Indirect Cost Pools.....	10-33
10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates .	10-38
10.3.4 Indirect Cost Certifications	10-47

10.1 IMPORTANCE AND COMPOSITION OF INDIRECT COSTS

Section Overview

Overview

In this section, you will learn

- which costs in a proposal are indirect, or may be treated as indirect
- more on the importance of indirect costs
- about the contractor's responsibility in designating direct and indirect costs
- guidance available to the contractor to determine direct/indirect costs

Maps in This Section

This section includes the following maps:

- Importance and Composition of Indirect Costs
 - Direct/Indirect Cost Decision
-

10.1.1 Importance and Composition of Indirect Costs

Introduction

FAR 31.203

Indirect costs are known by many names. Generally, they are referred to as overhead or burden expense. Two types of cost are typically included in the category:

1. Costs that CANNOT practically be assigned directly to the production or sale of a particular product. In accounting terms, such costs are NOT directly identifiable with a specific cost objective.

For example, the costs involved in the maintenance of the firm's plant and equipment are so general that they cannot be specifically assigned to a particular contract. The same is true of the cost of accountants for general accounts.

2. Direct costs of minor dollar amount may be treated as indirect costs if the accounting treatment is consistently applied and it produces substantially the same results as treating the cost as a direct cost.

Examples of this type of cost include common hardware items, such as washers, sandpaper, and lubricants. Usually, there is no net benefit to the contractor or the Government in trying to track every single washer or scrap of sandpaper against cost objectives.

While indirect costs are not assigned to the production or sale of a particular product, they are necessary costs of doing business. Some portion of indirect costs are properly allocable to each contract.

(continued on next page)

10.1.1 Importance and Composition of Indirect Costs

(continued)

Importance

While indirect costs are an important consideration in the analysis of every cost proposal, the share of cost that they represent will vary from firm to firm and industry to industry. For example, expect indirect costs to represent a larger share of a cost proposal for industrial production than for contract services. Manufacturing operations typically require substantial investments in plant and equipment — the very type of spending that, in general, cannot be directly charged to any one product. Services typically do not require a similar level of investment in plant and equipment.

A recent study of large Defense contractors by the Institute for Defense Analysis provides insight into the growing importance of indirect cost in large manufacturing firms. The data presented in the table below for 1974 and 1987 are actual data collected during the study. The figures for the year 2020 are extensions of the trends identified between 1974 and 1987 and are presented to highlight the implications of the identified trends for the future of government contract pricing.

CATEGORY OF COST	PERCENT OF BUSINESS		
	1974	1987	2020 ¹
Direct Labor			
Manufacturing Labor	14	10	3
Engineering-Related ²	11	14	20
Direct Material	32	26	15
Plant-wide Indirect Cost	43	50	62
Total Cost	100	100	100

¹ Projected data

² Engineering-related cost includes both engineering and other direct costs

The magnitude of indirect costs in a typical cost proposal emphasizes the importance of careful analysis of indirect costs in contract pricing. Furthermore, the above data indicate that thorough analysis of indirect cost can be expected to be even more important in the future.

(continued on next page)

10.1.1 Importance and Composition of Indirect Costs

(continued)

**Composition
of Indirect
Costs**

Grouping indirect costs under titles, such as the title “plant-wide indirect costs” used in the table above, seems to imply that the costs are homogeneous. In fact, the term “indirect costs” covers a wide variety of cost categories. Furthermore, the costs are not all incurred for the same reasons. Some indirect costs are related to specific operations, while others are related to the general operation of the firm.

**Two Basic
Types**

In general, indirect costs fall into two broad categories:

1. Indirect costs related to specific jobs, such as:
 - Material Overhead
 - Manufacturing Overhead
 - Engineering Overhead

 2. General and Administrative (G&A) expenses— Management, financial, and other expenses related to the general management and administration of the business unit as a whole. To be considered a G&A expense of a business unit, the expenditure must be incurred by, or allocated to, the business unit. Examples:
 - Salary and other costs of the executive staff of the corporate or home office.
 - Salary and other costs of such staff services as legal, accounting, public relations, and financial offices
 - Selling and marketing expenses
-

10.1.2 Direct/Indirect Cost Decision

Introduction	The decision to classify a cost as direct or indirect is not always a clear choice. There is no absolute list of costs that belong in one class or the other. Contractors have the right and responsibility to define costs within their own accounting systems. At the same time, the Government prescribes guidelines, such as those described below, for use by contractors in making their decisions and for use by you in reviewing the appropriateness of their decisions.
--------------	--

Contractor's Decisions	The primary responsibility for establishing accounting practices rests with the contractor. Within guidelines established by the professional accounting community, the Securities and Exchange Commission, and the Federal procurement regulations, the contractor is free to establish accounting practices that meet the management needs of the firm. The role of government representatives — be they auditors, analysts, or contracting officers — is not so much directing or approving accounting practices as it is reviewing the adequacy and acceptability of contractor accounting systems for use on government contracts.
------------------------	---

Guidelines	Contractor decisions, and your review, are governed by: FAR 31.202, Direct Costs; FAR 31.203, Indirect Costs; Generally Accepted Accounting Principles (GAAP); and applicable Cost Accounting Standards (CAS).
------------	--

FAR 31.202 & 31.203

	The guidelines presented in these documents is subject to interpretation by the contractor, auditors, inspectors general, General Accounting Office (GAO), and other accounting professionals.
--	--

Different experts often interpret the same guidance differently. Differences can be minor or major. As a contracting officer, you may be called upon to negotiate a resolution to cost differences that result from differing interpretations. Differences of opinion are usually resolved through negotiations, but some are finally resolved through contracting officer determinations or decisions by boards of contract appeals or Federal courts.

(continued on next page)

10.1.2 Direct/Indirect Cost Decision

(continued)

Direct Costs <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR 31.202</div>	The FAR defines a direct cost as any cost that can be identified specifically with a particular final cost objective. For our purpose, a final cost objective is normally a contract deliverable. If a cost is identified specifically with a final cost objective, contractors must charge it to that cost objective and no other.
---	---

Indirect Costs <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR 31.203</div>	The FAR defines an indirect cost as any cost that is: <ul style="list-style-type: none"> • Not directly identified with a single, final cost objective, BUT • That is identified with two or more final cost objectives or an intermediate cost objective. <p>As indicated on page 10-5, minor direct costs may be allocated as indirect costs provided that the allocation is consistently applied to all final cost objectives and produces substantially the same results as treating the cost as a direct cost.</p>
---	---

GAAP	Generally Accepted Accounting Principles (GAAP) are general rules used by all business entities. They are non-regulatory guidance developed and used by Certified Public Accountants. As with other accounting issues, the cognizant Government auditor can be very helpful in answering questions on GAAP coverage.
------	--

CAS <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAR Part 30 FAR App. B</div>	Cost Accounting Standards (CAS) are issued by the Cost Accounting Standards Board (CASB). When these standards are applicable, they take priority over other forms of accounting guidance. See Chapter 3 of this text/reference (Allowability), and FAR Part 30, Cost Accounting Standards, for additional information.
--	---

10.2 INDIRECT COST RATES

Section Overview

Overview

This section discusses how the indirect cost rate is calculated from the pool and base. Each of these elements of the rate is examined.

You will learn how indirect costs are grouped into pools and the two general types of pools: primary and secondary. You will see how the rate relates the contractor's direct efforts (the base) to the indirect costs in the pool.

Finally, you will be shown the process for estimating indirect cost rates.

Maps in This Section

This section contains the following maps:

- Indirect Rate Formula
 - Indirect Cost Pools
 - Bases
 - Estimating Indirect Cost Rates
-

10.2.1 Indirect Rate Formula

Introduction

As you learned earlier, indirect costs are not directly identified with a single, final cost objective. Since they are not related to a single cost objective, how do you know when an indirect cost should be charged to a particular contract? We use indirect cost rates. As more and more direct manufacturing effort is required to complete a particular contract, you should expect to pay more and more of the indirect costs that the contractor incurs in support of manufacturing — costs such as supervision, utilities, and maintenance.

The Formula

The amount that is charged to a particular contract is determined by the appropriate indirect cost rates (also known as overhead or burden rates). Indirect cost rates are expressed as a factor, such as dollars/hour or percentage of cost. As a factor, indirect cost rates are calculated by dividing a “pool” of indirect cost by a “base” representative of direct activity.

$$\frac{\text{indirect cost pool}}{\text{base}} = \text{rate}$$

Once the rate has been established, multiply the estimated or actual base amount **of the contract** by the rate to determine the amount of indirect cost that should be allocated to the contract. The more a specific contract accounts for a firm's direct costs, the larger that contract's share of the related indirect costs.

Do not fall into the trap of looking at a rate and immediately determining that it is too high without analysis of the base and pool. A rate of 400 percent can be good and a rate of 100 percent can be bad depending on the types of cost in the base, types of costs in the pool, and the overall effect on total cost and the operations of the firm. Also be wary of rates justified by comparison to the rates of other firms (whether or not broken down by size).

In this section you will be introduced to typical indirect cost pools, considerations for selecting allocation bases, and typical bases.

10.2.2 Indirect Cost Pools

Definition

$$\frac{\text{Indirect Cost Pool}}{\text{base}} = \text{rate}$$

An indirect cost pool is a logical grouping of indirect costs with a similar relationship to the cost objectives. For example, engineering overhead pools include indirect costs that are associated with engineering. Likewise, manufacturing overhead pools include indirect costs associated with manufacturing activities. By pooling similar indirect costs for allocation, the contractor should get approximately the same distribution of indirect costs as if the firm allocated each indirect cost separately.

Examples

The table on the next page lists some of the more common pools and types of costs often found in each pool. A cost listed under a single pool, such as 'Manufacturing Overhead', may be grouped with other listed costs into a single pool, charged as separate pool, or fragmented into several separate pools. Remember, every firm's accounting system is different. The following list is only "typical"; do not regard it as the only correct way to group costs.

(continued on next page)

10.2.2 Indirect Cost Pools

(continued)

Typical Pools

(continued)

COMMON POOLS	TYPICAL COSTS FOUND IN THE POOL
Material Overhead	Indirect labor
	Employees related expenses (shift & overtime premiums, employee taxes, fringe benefits)
	Acquisition (Purchasing)
	Inbound Transportation
	Receiving & Inspection
	Material Handling & Storage
	Vendor Quality Assurance
	Scrap Sales Credits
	Inventory Adjustments
Manufacturing Overhead	Indirect labor
	Perishable Tooling
	Employees related expenses
	Indirect material & supplies (small tools, grinding wheels, lubricating oils)
	Fixed charges (e.g., depreciation, insurance, rent, property taxes)
	Downtime of direct employees (training, vacation pay, regular pay when not working on a specific contract/job)
Engineering Overhead	Employee related expenses
	Downtime of direct employees
	Fixed charges
	Indirect material & supplies
	Indirect labor & supervision
General & Administrative	General & executive office expense
	Staff services (legal, accounting, public relations, financial)
	Selling and marketing expenses
	Corporate or home office expense
	Independent Research and Development (IR & D) cost
	Bid and Proposal (B & P) cost
	Other miscellaneous activities related to overall business operation

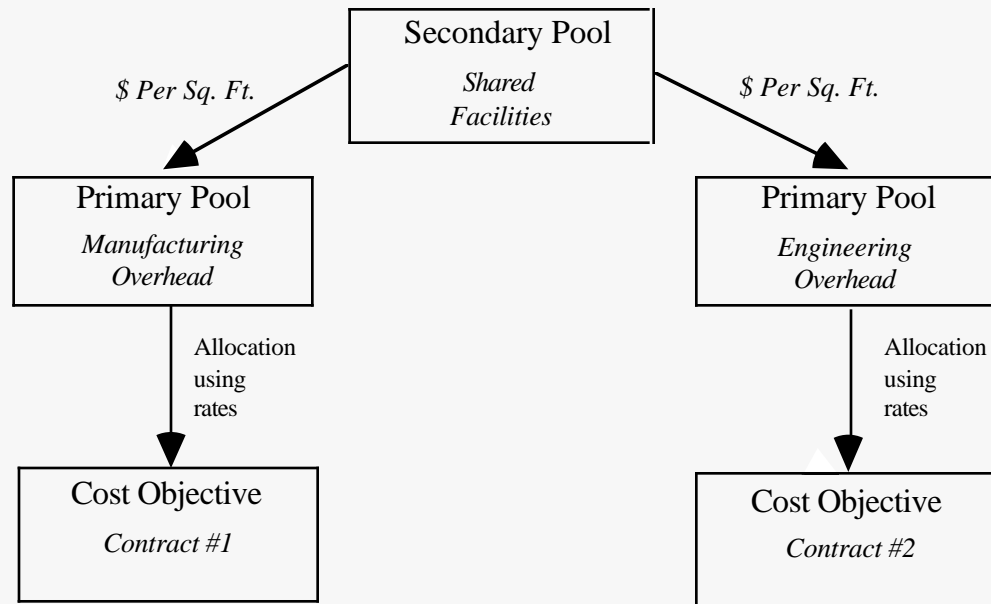
(continued on next page)

10.2.2 Indirect Cost Pools

(continued)

Secondary Pools

Indirect cost pools can be divided into two general types: primary and secondary. The primary pool is the one that is used to develop an indirect cost rate. The secondary pool is an intermediate pool that is used to allocate costs to primary pools.



Some indirect costs obviously belong to one specific indirect cost pool. For example, the salary of a manufacturing manager would obviously be charged as part of manufacturing overhead. The company president's salary would be part of general and administrative cost. These costs therefore appear only in a "primary" pool.

The proper account for other indirect costs may not be so obvious. For example, a building is shared by manufacturing and engineering. Should building depreciation, utilities, and maintenance be charged to engineering or manufacturing? The answer is that both should share the costs. A reasonable share of each cost could be separately allocated to the appropriate primary pool, or the related costs could be grouped and allocated together. If the costs are grouped for allocation, the cost grouping is known as a secondary pool.

Typically, you will not see charges from a secondary pool in the data submitted with the cost proposal. You will only see the results. However, secondary pool allocations must be reasonable to assure proper allocation of costs to final cost objectives. The auditor should, when looking at the firm's books, ensure that secondary pool expenses are properly allocated to final cost objectives.

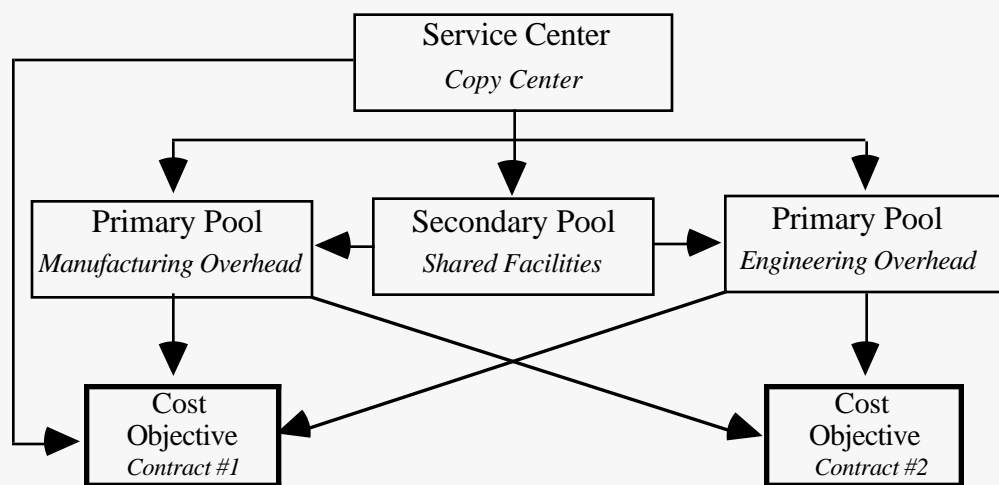
(continued on next page)

10.2.2 Indirect Cost Pools

(continued)

Service Centers

Service centers are unique in that they include costs that can be allocated as a direct cost or an indirect cost depending on the particular circumstances. Primary concerns are (1) identification of the user of the service and (2) purpose of that use. A good example is a copy center where costs are allocated based on the number of copies reproduced. A copy of a manufacturing drawing might be charged to manufacturing overhead. A copy of an engineering report might be charged to engineering overhead. A copy of the facility manager's weekly calendar might be charged to the facilities secondary pool. Finally, a deliverable copy of a research report prepared for the government might be charged as a direct cost.



The important thing to remember about service centers is the need for clear definition of how the costs will be allocated. The circumstances related to each different type of accounting treatment are particularly important. Clear definition will help you avoid paying a service center cost twice through incorrect charging of a cost as a direct cost while it is also being charged as an indirect cost.

SERVICE CENTER EXAMPLES	
Scientific Computer Operations	Communication Services
Business Data Processing	Facility Services
Photographic Services	Motor Pool Services
Reproduction Services	Company Aircraft Services
Art Services	Wind Tunnels
Technical Typing Services	

10.2.3 Bases

Definition

$$\frac{\text{indirect cost pool}}{\text{Base}} = \text{rate}$$

A base is some measure of direct contractor effort that can be used to allocate pool costs based on benefits accrued by the several cost objectives. Examples of typical bases:

- Direct labor hours
- Direct labor dollars
- Number of units produced
- Number of machine hours.

The type of base determines whether the indirect rate will take the form of a percentage or a dollar rate per unit of measure. Using manufacturing as an example, the following are common bases and the resulting rates:

$$\frac{\text{Pool Dollars}}{\text{Direct Labor Hours}} = \text{Dollars per Direct Labor Hour}$$

$$\frac{\text{Pool Dollars}}{\text{Direct Labor Dollars}} * 100 = \text{Percent of Direct Labor Dollars}$$

$$\frac{\text{Pool Dollars}}{\text{\# of Production Units}} = \text{Dollars per Unit of Production}$$

$$\frac{\text{Pool Dollars}}{\text{Machine Hours}} = \text{Dollars per Machine Hour}$$

Whatever the measure, remember this rule of thumb: The larger your share of the base, the larger your share of costs in the indirect pool.

Selecting a Base

When selecting a base for the pool, contractors consider the type of indirect costs in the pool and whether the base will provide a reasonable representation of the relative consumption of pooled indirect costs by direct cost activities. Any given base should be representative of the breadth of activities supported by the pooled indirect costs.

(continued on next page)

10.2.3 Bases

(continued)

Selecting a
Base

(continued)

For example, if the firm's manufacturing operation is labor intensive and the pool is predominantly labor related, such as supervisory labor and fringe benefits, the contractor will probably select a base related to labor effort for allocating manufacturing overhead costs. If the manufacturing operation is automated with little labor effort, the contractor will probably select a base related to the machinery use (such as machine hours).

Common
Bases

The following table represents some of the more common bases and the type of pools they are typically used to allocate:

ALLOCATION BASES	TYPES OF INDIRECT COST POOLS					
	MANUFACTURING	ENGINEERING	FIELD SERVICE	MATERIAL	GENERAL & ADMINISTRATIVE	SECONDARY POOLS
Total Cost Input ¹					•	
Value-Added Cost Input Base ²					•	
Direct Labor Dollars	•	•	•		•	
Direct Labor Hours	•	•	•		•	
Machine Hours	•					
Units of Product ³	•					
Number of Purchase Orders				•		
Direct Material Cost				•		
Total Payroll Dollars						•
Head Count						•
Square Footage						•

¹ Also referred to as the "Cost of Goods Manufactured" during the accounting period, or "production cost." It typically includes all costs except General and Administrative.

² Also referred to as "Conversion cost". It is the sum of direct labor costs, other direct costs, and associated indirect costs.

³ Units Produced refers to units of final product produced. It is only an acceptable base when final products are relatively homogeneous and represent a reasonable measure of benefit from the appropriate pool.

10.2.4 Steps In Estimating Indirect Costs

Introduction

Actual indirect costs are not known until after the end of the accounting period. Hence, rates used during the period are based on estimates of the base and pool for the period. Initial rate estimates for a particular accounting period are generally developed before the beginning period. When contracts are priced for future periods, contractors might estimate rates three to five years in advance.

Estimates of indirect costs and indirect rates are developed through the contractor's planning and budgeting system. Any company, whether it is engaged in Government or commercial enterprises, must make some estimate of its future business. While the exact process varies from contractor to contractor, the general sequence is the same.

STEP	ACTION
1	Estimate Volume Volume means the total goods and services that the firm expects to sell to ALL customers during each upcoming period (e.g., fiscal year of the firm).
2	Estimate Bases Bases are units of direct labor and direct materials necessary to meet the total sales demand. Units can take the form of dollars, hours, or any other such measurements.
3	Estimate Pools Pools include the costs of all indirect activities necessary to support direct efforts on cost objectives. The largest portion of indirect costs are people related (indirect labor, supervision, fringe benefits, and other such expenses).
4	Estimate Indirect Cost Rates Divide each indirect pool by its base.
5	Apply Indirect Cost Rates Multiply indirect cost rates by proposed base amounts for the contract to estimate indirect costs of the contract.

(continued on next page)

10.2.4 Steps In Estimating Indirect Costs

(continued)

Estimate Volume

The starting point for any rate estimate is a sales forecast. For each product line, estimators forecast how many units will be produced and sold. For services, estimators estimate the number of contracts that the firm will be awarded and the dollar value of those contracts. Separate forecasts are developed for each accounting period. The supporting data may be rather speculative, especially for years further in the future. The forecast should include all work that is on contract, backlogged work, and work not yet on contract but is reasonably expected. The forecasts are not limited to just your contract. The forecasts **MUST** cover **ALL** work the contractor should reasonably expect to perform.

An accurate estimate of volume is essential to estimating indirect cost rates, because indirect pools are typically composed primarily of fixed and semivariable costs. As you saw in Section 6.4, unit costs decline as fixed costs and the fixed component of semivariable costs are spread over more and more units. Similarly, indirect cost rates typically decline as volume increases. Given a choice, contractors normally prefer to conservatively estimate business volume, resulting in overly high indirect rates.

Estimate Bases

The next step is to translate the sales or volume forecasts into production or performance schedules. Given the projected schedules, the estimator can then forecast total direct labor and material requirements for the accounting period. Many of the techniques covered in earlier chapters — such as bills of material, improvement curves, and historical projections — may be used in estimating direct costs.

FAR Table 15-2 requires the offeror to “Indicate how offeror has computed and applied offeror's indirect costs, including cost breakdowns, and showing trends and budget data, to provide a basis for evaluating the reasonableness of proposed rates. Indicate the rates used and provide an appropriate explanation.” That information should include:

- An explanation of how the base was estimated
- An estimate of the size of the base
- Data on the historical trends in the base

(continued on next page)

10.2.4 Steps In Estimating Indirect Costs

(continued)

Estimate Bases

(continued)

Any analysis of the firm's base estimate should consider the relationship between the proposed base, related budget estimates, and the relationship between past estimates and actual bases. Make sure that you understand:

- How estimates were developed for the proposal and the budget
- Reasons for any significant differences between proposed, budgeted, and historical base values.

Estimate Pools

Given the estimated volume of work to be performed, the offeror next estimates the likely size of each indirect cost pool. As with the base, the offeror must provide adequate supporting documentation. The support should include:

- the estimated dollar value of the pool
- an explanation of how the pool was estimated
- the date that the pool estimate was developed
- data on historical trends in the pool
- an explanation of any significant differences between the historical, proposed, and budgeted dollar values of the pool

As described in the section on volume estimates, indirect cost pools are typically composed primarily of fixed and semivariable costs. As volume increases, the indirect cost rate will decrease because the fixed portion of the pool is spread over a larger volume. However, variable indirect costs will increase as the level of business volume increases. As a result, the indirect cost rates will decrease less rapidly than increases in volume, depending on the extent to which the indirect costs are variable or fixed.

10.2.4 Steps In Estimating Indirect Costs

(continued)

To consider the effect that changes in volume have on indirect cost rates, firms typically use “flexible budgets.” To develop a flexible budget, the firm develops base and pool estimates at various potential volumes. The example below demonstrates how the flexible budget can be developed.

Example 1. An estimate of indirect supplies and services might be estimated based on number of units to be produced. The flexible budget might look like this for four levels of volume ranging from 4,000 to 7,000 units for the same period:

COST CATEGORY	VOLUME COSTS			
	4,000 UNITS	5,000 UNITS	6,000 UNITS	7,000 UNITS
Supplies & Services	\$32,000	\$33,000	\$34,500	\$35,500

Example 2. The number of purchasing department employees could be estimated based on the projected material purchases expressed in constant year dollars.

Example 3. Depreciation could be estimated using the projected depreciation on existing capital assets plus estimated depreciation on proposed future capital expenditures from the contractor's capital budget.

Example 4. Some staff functions may be estimated on a staffing basis. For example, the legal staff may be projected to remain at its present size with projected payroll cost increases estimated at 5% per year.

After forecasting indirect costs at several potential levels of volume, the estimator can use quantitative techniques (such as fitting a straight line to the data) to determine the general relationship between volume and indirect cost. Once the general relationship is defined, the estimator can then come up with specific numbers for pool costs at other levels of volume within the relevant range of the available data.

(continued on next page)

10.2.4 Steps In Estimating Indirect Costs

(continued)

Estimate Rates

When all the base and pool estimates have been made, the only thing remaining is to divide the pool estimates by the base estimates to establish the rates. The following table presents forecasts that have been developed for volume, base, and pool for the next four years:

ESTIMATE	YEAR #1	YEAR #2	YEAR #3	YEAR #4
Sales Estimate	1,000 Units	1,500 Units	1,300 Units	1,200 Units
Direct Labor (\$000)	\$10,000	\$15,000	\$13,000	\$12,000
Direct Material (\$000)	\$40,000	\$60,000	\$52,000	\$48,000
Manufacturing Overhead (\$000)	\$30,000	\$40,000	\$36,000	\$34,000
Total Production Cost (\$000)	\$80,000	\$115,000	\$101,000	\$94,000
G&A Cost (\$000)	\$13,040	\$16,500	\$15,100	\$14,400

You can use the estimates shown in the table above to estimate rates for the next four years:

	YEAR #1		YEAR #2		YEAR #3		YEAR #4	
	MFG O/H	G&A	MFG O/H	G&A	MFG O/H	G&A	MFG O/H	G&A
Pool \$000	30,000	13,040	40,000	16,500	36,000	15,100	34,000	14,400
BASE \$000	10,000	80,000	15,000	115,000	13,000	101,000	12,000	94,000
Rate %	300%	16.3%	266.7%	14.3%	276.9%	15.0%	283.3%	15.3%
MFG O/H Calculation: Manufacturing Overhead Dollars ÷ Direct Labor Dollars								
G&A Calculation: G&A Expense Dollars ÷ Total Production Cost (Total Production Cost = Direct Labor Dollars + Indirect Dollars + Direct Material Dollars)								

10.2.4 Steps In Estimating Indirect Costs

(continued)

Apply the
Rates

Offerors propose dollar figures for indirect costs by applying indirect rates to the appropriate base.

Using the rates already developed, let's assume the contractor submitted the following proposed costs for work to be performed in Year #1:

COST ELEMENT	PROPOSED COST
A. Material Dollars	\$100,000
B. Direct Labor Dollars (1,000 Direct Labor Hours @ \$25.00 per hour)	25,000
C. MFG O/H @ 300.0%	75,000
D. Total Production Cost (A+B+C)	200,000
E. G&A @ 16.3% of Total Production Cost	32,600
Total Cost (D+E)	\$232,600

The following is the process by which the offeror developed a cost proposal of \$232,600 to perform the work.

- Estimate direct material and direct labor costs of performance, using the techniques described in Chapters 7 and 8.
- Multiply proposed direct labor dollars by the plant-wide overhead rate (300%), resulting in an estimate of \$75,000 for manufacturing overhead charges against the contract.
- Total the proposed production costs (\$200,000).
- Multiply total production costs by the proposed G&A rate (16.3%), resulting in a estimate of \$32,600 for G&A charges against the contract.
- Add estimated G&A dollars to the total production cost, resulting in a total proposed cost of \$232,600.

10.3 INDIRECT COST ALLOCATION CYCLE

Section Overview

Overview

In this section, you will be introduced to:

- the negotiation and application of indirect cost forward pricing rates
- determining final indirect rates at the end of the accounting period
- how final rates impact specific contracts, in terms of “over applied” and “under applied” overhead
- analysis of proposed indirect cost forward pricing rates
- certification of indirect costs and rates

Maps in This Section

This section contains the following maps:

- The Indirect Cost Allocation Cycle
 - Examples of Indirect Cost Pools
 - Analysis of Proposed Indirect Cost Forward Pricing Rates
 - Indirect Cost Certifications
-

10.3.1 The Indirect Cost Allocation Cycle

Phases

-
- Phase 1. *Forward Pricing.* Negotiate indirect cost forward pricing rates for the accounting period (e.g., corporate fiscal year). Apply the rates to estimate the indirect costs of contracts which will be performed in that period.
- Phase 2. *Cost Incurrence.* Contractors incur direct and indirect costs during the accounting period. Under fixed price contracts with progress payments and cost type contracts, the Government provides interim reimbursement of indirect costs at pre-established “billing rates.”
- Phase 3. *Allocation.* After the accounting period, establish final indirect rates for the period. Using the final rates, allocate indirect costs incurred during the accounting period to contracts performed in that period.
-

Phase 1 Forward Pricing

Negotiate Forward Pricing Rates

“Indirect cost forward pricing rates” are rates for estimating indirect costs that will be incurred by the firm during a given accounting period. When negotiating such rates, the contracting officer considers:

- The offeror's proposed forward pricing rates
- Government recommended rates (when available)
- Negotiated forward pricing rate agreements (if any)

Proposed Forward Pricing Rates. These are the rates proposed by the contractor. As you have already learned, rates are commonly developed for the current year plus three to five years into the future. Be warned that some firms have several indirect rate arrangements and select the rate arrangement that is to their best advantage for each procurement. The more competitive the procurement, the more competitive the proposed indirect rates. Particularly in the absence of audit support, compare proposed rates with those submitted by the same firm for other solicitations issued by your contracting activity or other activities.

Government Recommended Rates. These are rates developed by Government personnel. Audit reports typically recommend positions on proposed indirect rates. The responsible contract administration office may also enclose a separate Forward Pricing Rate Recommendation (FPRR) in the field pricing report. A Government estimator may recommend rates that differ from the proposed rates because of differences in the estimated values for volume, pools, and/or bases.

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

Phase 1 Forward Pricing

(continued)

FAR 15.809

Negotiating indirect rates tends to be time consuming and contentious. Fortunately, such negotiations may not be necessary if the Government and contractor already have a Forward Pricing Rate Agreement.

Forward Pricing Rate Agreements. At contractor locations with significant Government business, the cognizant Administrative Contracting Officer may negotiate a Forward Pricing Rate Agreement (FPRA). The FPRA is a formal bilateral agreement that binds (1) the contractor to propose the negotiated rates and (2) the Government to accept them in pricing individual contracts. The agreements also provide for “overturning” all or a portion of the agreement if circumstances change and the rate(s) are no longer valid representations of future costs.

The Administrative Contracting Officer (ACO) is responsible for monitoring the contractor's rates. Therefore, any questions on the status and acceptability of FPRAs should be directed to the ACO. Further, if you believe that work to be performed on your contract will significantly affect the rates, you should notify the ACO immediately and request a review to determine the impact of your contract on the rates.

FAR Table
15-2

FAR Table 15-2 requires that if agreement has been reached with Government representatives on forward pricing rates, the offeror must identify the agreement, include a copy, and describe the nature of the agreement. The agreement description should identify the Government representative with whom the agreement was reached, the date of the agreement, and the period of contemplated use.

Estimate Indirect Costs

After determining indirect cost rates for pricing the contract, multiply the rates by their respective bases to estimate indirect costs. Do this separately for each period during which work on the contract will be performed, using the base amounts and rates for that period.

For example, suppose your prenegotiation position on the 19XX indirect cost rate for engineering overhead is 50% of direct engineering costs. To estimate engineering overhead for a contract, multiply that percentage by your prenegotiation position on direct engineering costs for work on the contract to be performed in 19XX. If your prenegotiation position on direct engineering cost is \$500,000, your position on 19XX engineering overhead for the contract would be \$250,000.

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

Phase 1 Forward Pricing

(continued)

Apply the indirect cost rate to all work included in the base. For example, if the direct labor costs from three departments — machining, fabricating, and assembly — are the base for the manufacturing overhead rate, you must multiply the sum total of **all** machining, fabricating, and assembly direct costs by the manufacturing overhead rate to estimate the dollar figure for manufacturing overhead.

On the other hand, do not apply the manufacturing overhead rate to cost categories not included in the base. Again, using manufacturing overhead as an example, you would not apply manufacturing overhead to field service hours since field service is not part of the allocation base. *Only apply overhead rates to those costs included in the allocation base.*

Differences between the contractor's estimate of indirect costs and your estimate can come from two sources — rate differences and base differences. If the government recommended rate is different than the rate proposed by the contractor, use the recommended rate in developing your estimate of a fair and reasonable price. If your estimate of the base differs from the proposed amount, use your estimate for the base.

Phase 2 Cost Incurrence

During the accounting period (e.g., corporate fiscal year), the contractor incurs costs for indirect pools and their respective bases.

If awarded a cost type contract or fixed price contract with progress payments, contractors bill the Government at regular intervals (e.g., biweekly or monthly) for the incurred costs. To bill the Government for indirect costs, contractors use interim “billing rates” agreed to by the Government. Once established, billing rates may be prospectively or retroactively revised to prevent substantial overpayment or underpayment of indirect costs. After the accounting period (e.g., fiscal year) has expired, the Government applies final indirect cost rates for the accounting period to determine whether the contractor was overpaid or underpaid for indirect costs (based in part on whether billing rates were higher or lower than the final rates).

FAR 42.7

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

**Phase 3
Allocation****FAR 42.705****Establish Final Indirect Cost Rates**

Once an accounting period is over and the books are closed, contractors develop final indirect rates for the period. For such contract types as cost reimbursable and fixed price incentive, the contractor's final rates are subject to negotiation with the Government or final audit determination. The contractor then applies final indirect rates to allocate incurred indirect costs to contracts.

Final indirect cost rates often differ significantly from the indirect forward pricing rates used prior to award in pricing the contract.. The following example illustrates the impact of such differences on the contractor's profit for a firm fixed price contract.

COST ELEMENT	NEGOTIATED		INCURRED	
Material Dollars		\$100,000		\$100,000
Direct Labor Dollars ¹		\$25,000		\$25,000
MFG Overhead	@ 300% ²	\$75,000	@ 260% ³	\$65,000
Total Production Cost (TPC)		\$200,000		\$190,000
G&A	16.3% of TPC ²	\$32,600	17.4% of TPC ³	\$33,060
Total Cost		\$232,600		\$223,060
Profit		\$23,260		\$32,800 ⁴
Total Price		\$255,860		\$255,860

¹ Direct labor dollars = 1,000 hours * \$25.00/hr

² Forward Pricing Rates

³ Final Indirect Rates

⁴ Price less actual cost

On a firm fixed-price contract, there is no price adjustment after the contract is completed. The contractor assumes 100% of the risk for cost increases. The contractor also may keep 100% of any cost underruns. In the above example, the contractor's profit increased by \$9,540.

If the contract had been cost reimbursement or fixed-price incentive, the final indirect rates would have been used to adjust the contract price. The Government would have shared the \$9,540 in cost savings as specified in the contract. The same would have been true of any overruns.

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

Phase 3 Allocation

(continued)

In the above example, note that there was no difference in the figures for direct labor cost in the negotiated and incurred cost columns. The manufacturing overhead rate and G&A rates changed because the indirect costs and base costs incurred by the firm on all work performed during the period on all contracts awarded to the firm differed from the estimates used in pricing the contract. Since the indirect rates are developed for all contracts, not individual contracts, the changes might NOT be directly related to performance of your individual contract.

Remember, a rate is based on a simple formula:

$$\frac{\text{indirect cost pool}}{\text{base}} = \text{rate}$$

If actual indirect costs vary significantly from estimates, the final rate will differ from the forward pricing rate. Likewise, if base costs vary significantly from estimates, the rates will differ as well.

Apply Final Rates

Once the final indirect rates are established, the contractor can determine the impact on individual contracts. The basic question is whether indirect costs were *over applied* or *under applied*.

Indirect costs are *over applied* when the contractor has applied, through the use of forward pricing rates, **more** indirect dollars to a contract than were actually spent (i.e., allocated to the contract), given the final indirect rates and the actuals for their respective bases. For a firm fixed price contract, this means that the contractor has realized a windfall.

Indirect costs are *under applied* when the contractor has applied, through the use of forward pricing rates, **less** indirect dollars to a contract than were actually spent, given the final indirect rates and the actuals for their respective bases. For a firm fixed price contract, this means that the contractor has suffered a shortfall.

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

Phase 3

(Continued)

Continuing our example, let's examine the contract data presented in the last table to determine why the contractor's profit increased by \$9,540.

NEGOTIATED		INCURRED		OVER/UNDER APPLIED
Direct Labor	\$25,000	Direct Labor	\$25,000	
Mfg Overhead @ 300%	\$75,000	Mfg Overhead @ 260%	\$65,000	Overapplied: \$10,000
Direct Material	\$100,000	Direct Material	\$100,000	
Subtotal	\$200,000	Subtotal	\$190,000	
G&A @ 16.3%	\$32,600	G&A @ 17.4%	33,060	Underapplied: \$460
Total Cost	\$232,600	Total Cost	\$223,060	
Profit @ 10%	\$23,260	Profit (price less cost)	\$32,800	Underapplied: \$9,540
Price	\$255,860	Price	\$255,860	

You can see the amount of over/under applied indirect costs for this contract. But, what caused the changes in the rates? To see what happened, compare the original Year #1 estimates with the actuals.

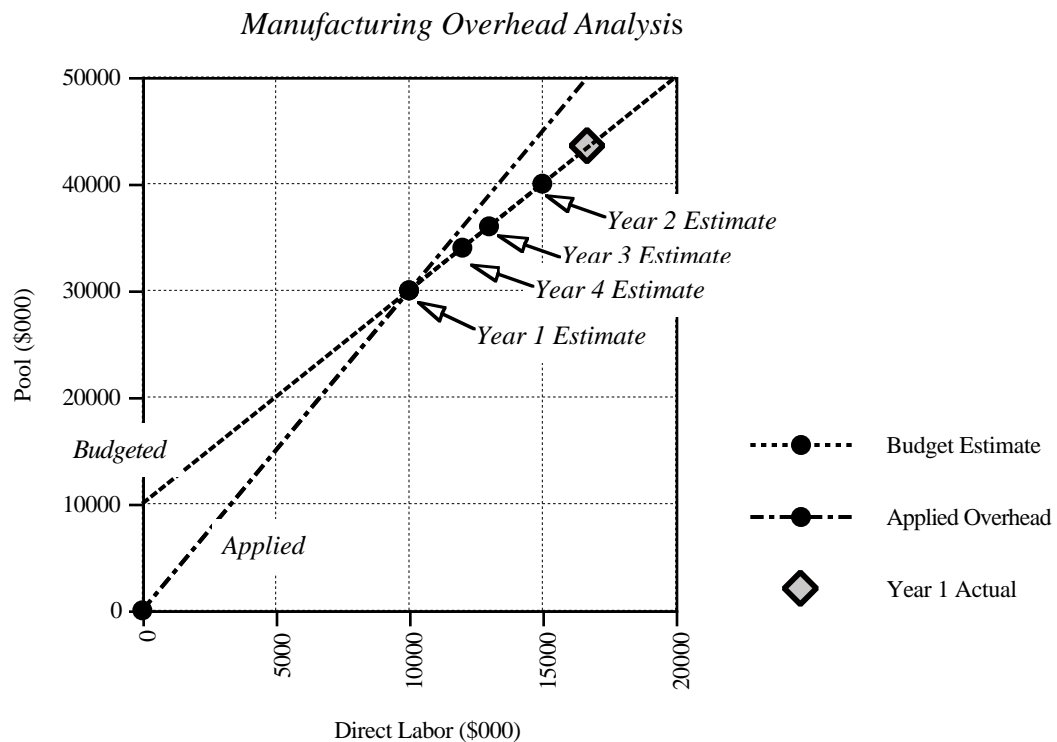
	YEAR ONE (EST)	YEAR ONE (ACTUAL)
Sales	1,000 Units	1,670 Units
Direct Labor (\$000)	\$10,000	\$16,700
Direct Material (\$000)	\$40,000	\$66,802
Manufacturing Overhead (\$000)	\$30,000	\$43,400
Total Production Cost (\$000)	\$80,000	\$126,902
G&A (\$000)	\$13,040	\$22,081
Actual Overhead Rate: = 260%		
Actual G&A Rate: = 17.4%		

The change in the manufacturing overhead rate was due to an increase in the number of units sold and produced (from 1,000 units to 1,670). Indirect cost pools tend to be semi-variable and include most of the firm's fixed costs. Bases are predominantly variable. As a result, indirect rates typically fall as volume rises, because the fixed indirect costs are spread over a larger base. That is what happened to manufacturing overhead.

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)



Phase 3 Allocation

(continued)

The Applied Overhead line represents the negotiated indirect cost forward pricing rate (300% of direct labor dollars). The Budget Estimate line represents the firm's forecast of total manufacturing overhead at different levels of production (from the table on page 10-22). Note the following characteristics of the two lines:

- The Applied Overhead line passes through the origin, because indirect costs can only be charged if product is produced and sold. 300% of nothing = nothing.
- The Overhead Budget Estimate line has a positive intercept at \$10 million. In other words, manufacturing overhead includes \$10 million in fixed costs.
- The two lines intersect at the direct labor estimate of \$10,000,000 for the year — the point at which a 300% rate would recover \$30,000,000 in manufacturing overhead costs.

Note that the Actual Rate falls on the Budget Estimate line, which means that the firm accurately forecast the relationship between (1) manufacturing overhead and (2) direct labor. However, the firm was too conservative in forecasting sales and production for the period. Hence, the firm

(continued on next page)

10.3.1 The Indirect Cost Allocation Cycle

(continued)

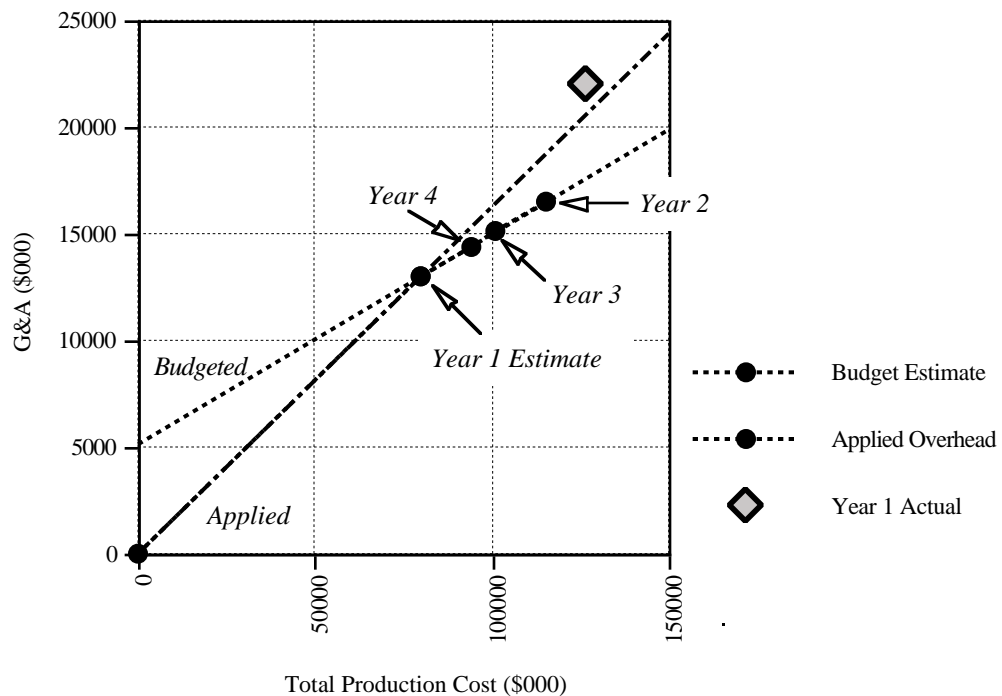
Phase 3 Allocation

(continued)

actually spent \$16,700,000 on direct labor for the period (even though the firm spent no more for direct labor on the Government contract than estimated). As a result, the actual Manufacturing Overhead rate was only 260%. Since the firm fixed price was based on a rate of 300%, the Government contributed \$10,000 more towards manufacturing overhead than it would have paid under a cost plus fixed fee contract.

A similar analysis of the G&A rate produces a different result. As with Manufacturing Overhead, the base was higher than expected for the year. Unlike Manufacturing Overhead, the G&A Expense dollars did not follow the cost pattern predicted by the Budget Estimate line. G&A costs were higher than expected relative to the actual base. The actual rate was 17.4% instead of the 16.3% used in pricing the contract. Hence, the firm fixed price fell short of covering the contract's actual share of G&A costs by \$460.

In short, the firm fixed price *overapplied* manufacturing overhead costs by \$10,000 but *underapplied* G&A by \$460. The net result: the firm's profit on the contract increased by (\$10,000 - \$460), or \$9,540.



10.3.2 Examples of Indirect Cost Pools

Introduction

So far in our discussion, the examples have been relatively simplistic. In order to give you a feel for how a complete detailed breakdown of a rate proposal might look, the following are examples of the calculation of a Manufacturing Overhead rate and a G&A Expense rate:

Manufacturing Overhead Rate

ACCOUNT TITLE	YEAR ENDED DEC 31, 19X5	YEAR ENDED DEC 31, 19X6	YEAR PROJECTED ENDING DEC 31, 19X7
Salaries & Wages			
Indirect Labor	\$1,338,330	\$1,395,245	\$1,472,160
Additional Compensation	80,302	83,950	88,000
Overtime Premium	13,214	11,296	4,500
Sick Leave	65,575	67,742	72,130
Holidays	79,164	83,006	87,080
Suggestion Awards	310	423	500
Vacations	140,272	147,891	154,300
Personnel Expenses			
Compensation Insurance	25,545	26,304	27,500
SUTA/FUTA*	50,135	52,692	51,500
FICA/Medicare	70,493	73,907	77,850
Group Insurance	153,755	161,401	169,130
Travel Expense	11,393	12,725	13,900
Dues & Subscriptions	175	175	175
Recruiting & Hiring	897	574	250
Employee Relocation	4,290	3,562	1,825
Employee Pension Fund			
Salary	25,174	26,350	27,500
Hourly	62,321	65,497	64,200

*State and Federal Unemployment taxes

(continued on next page)

10.3.2 Examples of Indirect Cost Pools

(continued)

Example:
Manufacturing
Overhead Rate
 (continued)

ACCOUNT TITLE	YEAR ENDED DEC 31, 19X5	YEAR ENDED DEC 31, 19X6	YEAR PROJECTED ENDING DEC 31, 19X7
Training, Conferences, & Technical Meetings	418	539	575
Educational Loans & Scholarships	400	400	400
Supplies & Services General Operating	495,059	509,839	545,000
Maintenance: bldg	9,102	12,318	15,700
Stationary, Printing, & Office Supplies	23,052	24,125	25,500
Material O/H on Supplies	56,566	62,071	62,500
Maintenance: office equipment	9,063	10,875	15,000
Rearranging	418	3,523	500
Other	3,314	2,635	2,500
Heat, Light, & Power	470,946	489,123	517,200
Telephone	32,382	33,874	35,000
Fixed Charges Depreciation	187,118	175,641	439,850
Equipment Rental	7,633	7,633	7,633
Total Manufacturing Overhead	\$3,416,816	\$3,545,336	\$3,979,858
Manufacturing Direct Labor Cost			
Assembly Labor \$	934,444	950,432	889,700
Fabrication Labor \$	233,071	253,999	254,000
Inspection Labor \$	173,372	203,500	123,500
Total Manufacturing Direct Labor Cost	\$1,340,887	\$1,407,931	\$1,267,200
Manufacturing Overhead Rate	254.8%	251.8%	314.1%

(continued on next page)

10.3.2 Examples of Indirect Cost Pools

(continued)

Example:
General &
Administrative
Expense

ACCOUNT TITLE	YEAR ENDED DEC 31, 19X5	YEAR ENDED DEC 31, 19X6	YEAR PROJECTED ENDING DEC 31, 19X7
Salaries & Wages			
Indirect Labor	\$1,407,100	\$1,458,724	\$1,460,500
Additional Compensation	125,431	152,691	155,000
Overtime Premium	4,883	5,069	5,000
Sick Leave	34,875	32,937	32,500
Holidays	49,962	50,013	49,500
Suggestion Awards	240	225	250
Vacations	80,637	81,398	82,525
Personnel Expenses			
Compensation Insurance	1,025	1,103	1,200
SUTA/FUTA	22,465	23,591	23,600
FICA	31,419	31,519	32,000
Group Insurance	29,008	29,226	29,300
Travel Expense	62,513	64,987	67,000
Dues & Subscriptions	2,375	2,119	2,500
Recruiting	1,378	1,075	1,250
Employee Relocation	566	1,974	1,500
Employee Pension Fund			
Salary	33,097	34,123	35,000
Hourly	17,632	17,956	18,500
Training, Conferences, & Technical Meetings	7,003	7,536	7,500
Courtesy Meal Expense	6,238	5,436	7,000
Educational Loans & Scholarships	1,392	1,525	1,500

(continued on next page)

10.3.2 Examples of Indirect Cost Pools

(continued)

Example:
General &
Administrative
Expense
(continued)

ACCOUNT TITLE	YEAR ENDED DEC 31, 19X5	YEAR ENDED DEC 31, 19X6	YEAR PROJECTED ENDING DEC 31, 19X7
Supplies:			
Operating Supplies	2,010	1,724	2,000
Maintenance - bldg	411	856	750
Stationary, Printing, & Office Supplies	32,515	33,209	33,500
Postage	1,651	2,056	2,100
Material O/H on Supplies	1,732	1,634	1,980
Maintenance - equip	938	983	1,000
Other	15,829	16,982	17,500
Public Utilities:			
Telephone	59,105	61,372	65,000
Heat, Light, & Power	237,512	241,298	245,000
Miscellaneous Income & Expense:			
Legal & Auditing	16,714	10,945	15,000
Professional Services	21,197	23,791	22,500
Patent Expense	18,466	9,084	10,000
Public Relations	12,155	14,172	15,000
Transfers Between Divisions	(48,243)	0	0
Corporate Expense	1,556,956	1,673,824	1,750,000

(continued on next page)

10.3.2 Examples of Indirect Cost Pools

(continued)

Example:
General &
Administrative
Expense
(continued)

ACCOUNT TITLE	YEAR ENDED DEC 31, 19X5	YEAR ENDED DEC 31, 19X6	YEAR PROJECTED ENDING DEC 31, 19X7
Fixed Charges:			
Insurance - Property	9,820	10,930	11,000
Insurance - Inventories	4,024	4,543	4,500
Franchise Tax	239,390	246,624	250,000
Rent - Equipment	1,426	1,426	1,426
Total G&A Expenses	\$4,161,952	\$4,420,052	\$4,526,381
G&A Base Costs			
Engineering Exp - Pool	4,565,345	4,793,612	5,033,293
Engineering Exp - Base	2,345,765	2,439,595	2,561,575
Manufacturing Exp - Pool	3,416,816	3,545,336	3,979,858
Manufacturing Exp - Base	1,340,887	1,407,931	1,267,200
Materials Exp - Pool	1,234,456	1,296,179	1,360,988
Materials Exp - Base	8,556,987	8,984,836	9,523,926
Total Cost Input for G&A Base	21,460,256	22,467,489	23,726,840
G&A Rate	28.64%	27.10%	26.91%

Note that the pool and base numbers for manufacturing overhead match the manufacturing pool and base numbers in the G&A allocation base calculation.

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

Introduction As you can see, analyzing proposed rates can be a major undertaking. If government audit and resident pricing personnel are available, take advantage of their knowledge and recommendations. However, if support is not available and you must perform an analysis on your own, consider the following steps in determining the reasonableness of indirect costs.

Step 1. Identify Unallowable Costs Review the cost elements identified as part of the indirect cost pool and consider the tests of allowability identified in Chapter 3. Use the following table as a guide.

FOR INDIRECT COSTS IN THE POOL	
If:	Then:
The proposed dollar amount is NOT reasonable	Reduce the dollar amount of the pool to reflect a more reasonable dollar value for that item
The proposed cost should have been treated as a direct cost (either against your contract or someone else's contract)	Subtract that cost from the total dollar value of the pool, and ensure the cost is directly charged to the proper contract.
This cost belongs in a different indirect cost pool.	Subtract that cost from this pool and add it to the dollar value of the correct pool.
The same cost is also represented in another indirect pool, or as a direct cost, or as part of a loading factor, (e.g., a packaging or obsolescence factor)	This is double charging. Develop your position on where that cost should be recognized and delete the duplicative entry.
The proposed cost is NOT properly allocable, in part or in whole, to the pool under CAS or GAAP	Reallocate costs consistent with CAS or GAAP.
The proposed cost is NOT allowable, in part or in whole, under the cost principles in FAR Part 31.205	Reduce the dollar amount of the pool commensurately.
The proposed cost is NOT allowable, in whole or in part, under the terms and conditions of the contract	

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

Step 2. Analyze the Base Estimate

As a minimum, consider the following questions in your analysis:

- ***Did the offeror use the base period prescribed by FAR 31.203(e) or, if applicable, Cost Accounting Standards (CAS)?***

FAR 31.203(e) states that “A base period for allocating indirect costs is the cost accounting period during which such costs are incurred and accumulated for distribution to work performed during that period. [Generally] ... the base period [is] ... the contractor's fiscal year. But a shorter period may be appropriate (1) for contracts in which performance involves only a minor portion of the fiscal year, or (2) when it is general practice in the industry to use a shorter period. When a contract is performed over an extended period, as many base periods shall be used as are required to represent the period of contract performance.” In most cases, be wary of any period short of the firm's fiscal year — especially if the Government would absorb too much of a seasonal cost (e.g., heating) that should be allocated over the whole fiscal year. If CAS applies, ensure that the contractor has complied with CAS requirements for base periods.

- ***Does the base include all costs associated with that base, whether allowable or not?***

You learned above that unallowable costs must be excluded from any proposed indirect cost pool. However, all costs are part of the base — even the unallowables. Hence, if a pool becomes a base for another indirect cost account, such as G&A Expense, the unallowable costs must be added back into the G&A Expense base.

- ***Will the base result in a fair allocation of the costs in the pool?***

FAR 31.203(b) requires that “Indirect costs shall be accumulated by logical cost groupings with due consideration of the reasons for incurring such costs.... *The base should be selected so as to permit allocation of the grouping on the basis of benefits accruing to the several cost objectives....*” (emphasis added)

If the pool is largely labor related (such as fringe benefits), the base should be a measure of labor effort, such as labor hours or dollars. If the pool is largely machinery related (such as depreciation and maintenance), the base should relate to machinery use, such as machine hours.

(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

Step 2.
Analyze the
Base Estimate
(continued)

- *When was the base estimate made?*

If the offeror is estimating a base for the fiscal year, an estimate made mid-way through the fiscal year is likely to be more accurate than an estimate made at the beginning of the year. Likewise, an estimate made for the next fiscal year should be more reliable than an estimate for a period three years in the future.

- *What information did the offeror consider in estimating the base?*

The offeror does not have perfect knowledge of what is going to happen in the future. Estimators must consider more than known business for the period in estimate development. Typically, the offeror will consider the following business forecast elements:

- Contracts in hand
- Options that may be exercised
- Proposals with a high probability of success (e.g., BAFOs)
- Solicitations in hand
- Sales forecasts of future customer requirements

Each element of the forecast should be assigned a probability of actual sale. Contracts in hand would be 100 percent. Other estimates would be assigned a lower “win” probability, based on an analysis of the probability of actually making the sale.

Be concerned about the reliability of such forecasts. If the firm's sales consist of only a few large Government contracts, place little faith in statistical estimates. Instead rely on the best expressions of Government plans. Where the total business activity of the firm includes a larger number of relatively small orders, give greater credence to statistical projections that are correctly made, given the available data.

(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

Step 2.
Analyze the
Base Estimate

(continued)

- *Are there other data that are significant to estimating the base?*

For example, did the offeror factor in all contracts and BAFOs that may affect volume during the period? Use the cognizant auditor and ACO as your principal sources for verifying that all relevant data are considered.

- *How stable has the base been over time?*

Particularly with respect to small businesses that are heavily dependent on a few contracts, the base may be quite unstable. If such a firm loses only one contract, indirect rates on its remaining contracts might skyrocket. That would be particularly significant if your contract with the firm would be cost reimbursable. You may need to consider contract terms to protect the Government from the risk of unexpected, substantial changes in burden rates.

(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

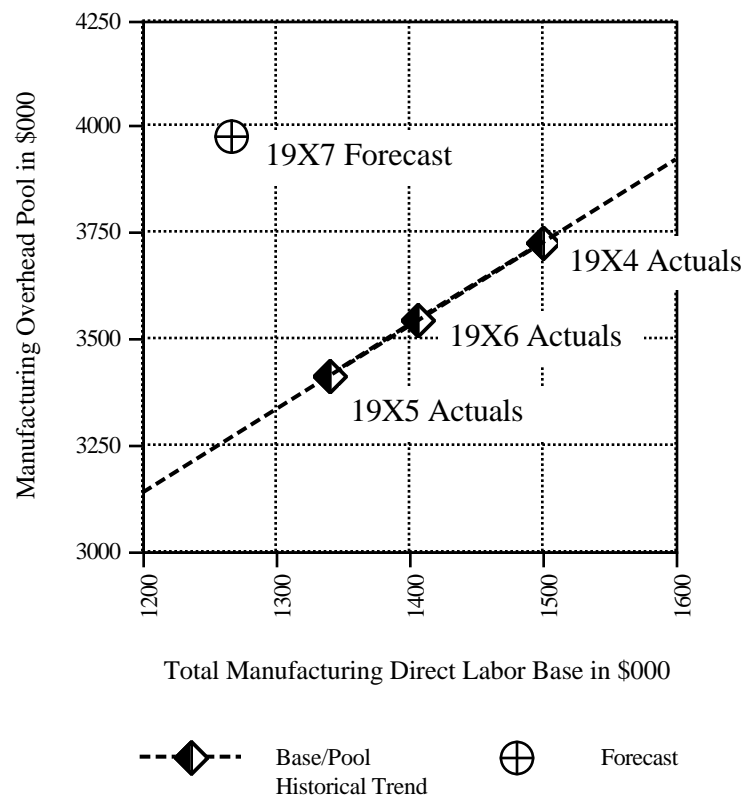
(continued)

Step 3. Analyze the Pool/Base Relationship

Examine the historic relationship between base and pool. The analysis can involve an in-depth analysis of the accounting data used to develop the proposed burden rate. Auditors typically use this technique to analyze burden rate estimates.

If detailed data are not available or the dollar value of the contract does not warrant detailed analysis, the relationship can be explored through use of a line-of-best-fit (see Chapter 6). Both base and pool will change with actual growth or decline in business activity. Using a line of best fit will enable you to establish the historical relationship between the changes in the base vs. changes in the pool. If projected costs deviate significantly from the best fit line, challenge the contractor to explain why.

The following graph demonstrates application of this technique to the manufacturing rate example presented on pages 10-33 and 10-34.



(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

Step 3. Analyze the Pool/Base Relationship

(continued)

In your review note the following:

- The table on pages 10-33 and 10-34 had only two data points of actual data for estimating the trend. To graph the historical trend, we obtained a third data point for Fiscal Year 1994, in which the actuals for the base and pool were \$1,500,000 and \$3,727,455, respectively.
- The estimated base dollars for 19X7 are below the range of the actual data (outside the relevant range)

Despite the shortcomings of available data, the graph does raise concern about the indirect cost rate projections. Most noteworthy, is the fact that the forecast pool dollars are higher than those in the historical data, while the base dollars are lower.

When changes in cost patterns are identified, question the contractor on the reasons for the change. As a minimum consider the following questions:

- *Has the composition of the pool or base changed over time?*

Be alert to any changes in the composition of either the base or pool. The offeror may have automated. Automation would increase depreciation expense in the indirect cost pool while decreasing any base related to direct labor. Indirect cost rates could increase while total cost declines.

- *Is the firm using the same rate structure for estimating purposes?*

A change in rate structure could result in costs being moved from one indirect cost pool to another. Ask the offeror if such changes have taken place.

- *Are changes in the rate consistent with the structure of the indirect cost pool?*

If the indirect cost pool is primarily composed of variable costs, the rate should be relatively insensitive to changes in business activity. If the indirect cost pool is primarily composed of fixed costs, the rate should be very sensitive to changes in business activity.

(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

**Step 4.
Analyze
Changes in the
Base and Pool**

You can consider changes in the base and pool independently. Using historical and projected costs, you can develop individual trend lines for pool and base costs.

Values used in this analysis should be in “constant year dollars.” The quickest and easiest way to convert the values to constant year dollars is use the same index number adjustments made by the contractor. There are two good reasons for using the same adjustments used by the contractor. First, you will be using the same assumptions as the contractor did when developing the original estimates. Second, by eliminating inflation, you can see the actual growth or decline in activity. If you have any concerns about the contractor's adjustments for inflation, deal with them before proceeding with further analysis.

We will demonstrate the use of this technique using the same manufacturing overhead proposal example. The following actual costs for 19X5 and 19X6 along with projected costs for 19X7 were taken from the contractor's proposal:

		19X5 (ACTUAL)	19X6 (ACTUAL)	19X7 (PROJECTED)
Current Year Dollars	Pool	3,416,816	3,545,336	3,979,858
	Base	1,340,887	1,407,931	1,267,200
Constant Year Dollars (Adjusted For Inflation)	Pool	3,416,816	3,368,069	3,591,822
	Base	1,340,887	1,337,535	1,143,648

(continued on next page)

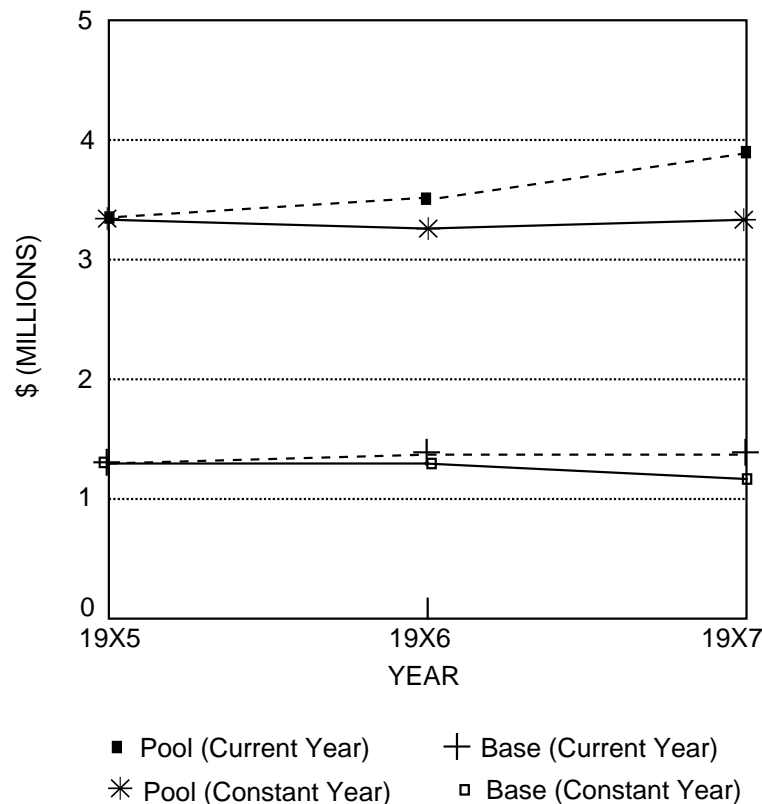
10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

Step 4. Analyze Changes in the Base and Pool

(continued)

The following graph depicts the data presented in the above table. The dot lines depict independently the base and pool in current year, unadjusted for inflation, dollars. The solid lines depict the same information in constant, adjusted for inflation, dollars.



Both sets of lines show a widening gap between pool and base dollars. However, where the current year dollar lines show the problem as escalating pool expenses, the constant dollar lines show, more clearly, that pool costs are increasing moderately with the real change being a steadily declining base. The data seems to confirm the general finding of previous analysis. Based on this analysis, you would probably want to take a closer look at the realism of the contractor's projected direct labor activity.

Other things to look for on this type of graph are:

- Sudden increases or decreases in total expenses
- A change, either increase or decrease, in either pool or base without a corresponding change in the other.

(continued on next page)

10.3.3 Analysis of Proposed Indirect Cost Forward Pricing Rates

(continued)

**Step 5.
Consider Past
Projection
Accuracy.**

Since you are dealing with projections, you may want to look at the contractor's past projection accuracy. Using the contractor's past estimates of future rates and information on actual rates, you can consider the accuracy of past projections:

YEAR OF ESTIMATE	PROJECTED YEAR	PROPOSED RATE	ACTUAL/ CURRENT RATE	PERCENTAGE POINT DIFFERENCE
19X5	19X6	259.1%	254.8%	4.3
19X4	19X5	256.3%	251.8%	4.5
19X3	19X4	260.0%	254.8%	5.2
On the average, the offeror overestimates indirect cost rates projections by 4.67 percentage points				

**Step 6.
Integrate
Your Results.**

Each prior step in the analysis has provided a different perspective on the reasonableness of the proposed indirect cost rate estimates. When viewed from all angles, the firm's direct labor cost base (in constant dollars) appears to be falling and the total cost of the pool appears to be rising at a very slow pace. While a continuation of this trend may appear reasonable at first glance, the contractor is estimating more dramatic changes in the pool and base than warranted by historical actuals. The question is why? This question seems particularly appropriate in light of the fact that the contractor has historically overestimated indirect cost rates.

Preliminary analysis of individual overhead accounts seems to indicate that the contractor may be investing heavily in new equipment (150 percent increase in depreciation between 19X6 and 19X7). Such investment might account for the proposed reductions in direct labor cost.

You need to consider all the facts, along with the contractor's past record for estimating accuracy, in your analysis.

10.3.4 Indirect Cost Certifications

Introduction	<p>There has been a great deal of confusion over proper certification of indirect costs and rates. There are basically two certifications you may encounter:</p> <ul style="list-style-type: none"> • Certification required by the Truth in Negotiations Act (TINA) • The Certificate of Indirect Costs which is required only on contracts subject to the DoD FAR Supplement (DFAR).
TINA Certification <div style="border: 1px solid black; padding: 5px; width: fit-content;"> FAR 15.804-4(g) 42.705-1 42.705-2 </div>	<p>When a contractor submits Certified Cost or Pricing Data in support of a contract negotiation, the indirect cost rates used in the proposal are also certified. <i>No separate certification is required for forward pricing rates.</i> The only time a separate Certificate of Current Cost or Pricing Data is required for indirect cost rates is at the completion of negotiation of final settlement rates. In the case of final rates, the FAR specifically requires a certificate.</p>
Certification of Indirect Costs	<p>The Certificate of Indirect Costs certifies that no unallowable costs are included in the indirect cost <i>proposal</i>. This is NOT a <i>negotiation certification</i>; it is a <i>proposal certification</i>. Further narrowing the applicability of this certification is that the rate proposal must be for billing or final indirect cost rates. When performing cost analysis, you generally will not be concerned with this certification, unless you are analyzing a forward pricing rate proposal or a final settlement rate proposal.</p>

End-of-Chapter Vignette

Now Andrew is REALLY confused!

- 1. The WEC proposed rates are based on trend analysis of past proposed rates. Is this approach reasonable? Why?*

- 2. The auditors based their analysis on the final rates for the completed cost accounting periods. Is this reasonable?*

- 3. The ACO report identifies a negotiated Forward Pricing Rate Agreement. What are the contractor's responsibilities under the agreement? ...the Government's responsibilities?*

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

4. *If you feel the FPRA rates are inaccurate, incorrect, or your negotiation may cause a change in rates, what should you do?*

5. *The ACO report stated that the change in the engineering overhead rates and the 19X9 manufacturing rate was due to changes in the associated direct labor rates. How can labor rates affect overhead rates?*

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

7. Complete the tables on this and the next page:

RATE AND YEAR	PROPOSED	AUDIT	FPRA
Material - 19X8			
Material - 19X9			
Engineering - 19X8			
Engineering - 19X9			
Manufacturing - 19X8			
Manufacturing - 19X9			
G&A - 19X8			
G&A - 19X9			

MATERIAL OVERHEAD	19X8	19X9	TOTAL
Direct Materials Cost Obj.			
FPRA For Materials			
Prenegotiation Objective (\$)			

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

ENGINEERING OVERHEAD	19X8	19X9	TOTAL
Direct Eng. Labor Cost Obj.			
FPRA for Engineering			
Prenegotiation Objective (\$)			

MANUFACTURING OVERHEAD	19X8	19X9	TOTAL
Direct Manu. Labor Cost Obj.			
FPRA for Manufacturing			
Prenegotiation Objective (\$)			

G&A		
COST ELEMENT	19X8	19X9
Manufacturing Labor		
Manufacturing Overhead		
Engineering Labor		
Engineering Overhead		
Material Costs		
Material Overhead		
Other Direct Cost		
TOTAL MANUFACTURING COSTS		
G&A FPRA Rate		
G&A Prenegotiation Objective (\$)		

Chapter Vignette

Facilities What?

“I don’t understand this one. I thought we were analyzing real costs; these ‘imputed costs’ aren’t real. Why are we doing this?”

“I appreciate your confusion,” said Kay, “but recognition of Facilities Capital Cost of Money is required by Cost Accounting Standards. Our departmental regulations must recognize that cost of money exists because Cost Accounting Standards take precedence over procurement regulations. Our regulations tell us how to handle these ‘imputed costs.’ Normally, the cost of money factors we use are developed by the responsible Government auditor and accepted by the cognizant Administrative Contracting Officer. Review your training materials, then look at the field reports to determine which rates we should use.”

Andrew still did not understand, but this is a new job, and besides, he was getting used to being confused!

Course Learning Objectives

At the end of this chapter, you will be able to define “facilities cost of capital” and generally describe how that cost is handled.

Chapter Overview

Overview

This chapter covers another aspect of contract cost: Facilities Capital Cost of Money. In it, you will learn about:

- the background and guidance upon which facilities capital cost of money is allowed
- how these factors are computed
- historical and projected net book value calculations
- how facilities capital cost of money is applied to specific contracts
- the use of DD Form 1861

Maps in This Chapter

This chapter contains the following maps:

11.1	FUNDAMENTALS OF FACILITIES CAPITAL COST OF MONEY	11-4
11.1.1	Background on Facilities Capital cost of Money.....	11-5
11.1.2	Basics of Cost Allowability	11-6
11.1.3	Facilities Capital Cost of Money Under CAS 414 and 417.....	11-8
11.2	DEVELOPING FACILITIES CAPITAL COST OF MONEY FACTORS	11-9
11.2.1	Developing Facilities Capital Cost of Money Factors	11-10
11.2.2	Historical and Projected Methods of Net Book Value Calculation.....	11-14
11.3	APPLYING FACILITIES CAPITAL COST OF MONEY FACTORS TO SPECIFIC CONTRACTS.....	11-16
11.3.1	Applying Facilities Capital Cost of Money Factors to Specific Contracts.....	11-17
11.3.1	DD Form 1861	11-19

11.1 FUNDAMENTALS OF FACILITIES CAPITAL COST OF MONEY

Overview

Overview

This section provides you with the fundamentals for understanding and working with facilities capital cost of money.

You will cover:

- the background for allowing facilities capital cost of money as a contract cost
- the basic factors governing the cost allowability of facilities capital cost of money
- distinguishing the treatment of cost of money under CAS 414 and 417

Maps in This Section

This section includes the following maps:

- Background on Facilities Capital Cost of Money
- Basics of Cost Allowability
- Facilities Capital Cost of Money Under CAS 414 and 417

11.1.1 Background on Facilities Capital Cost of Money

Purpose

Until 1976, the Government did not recognize facilities capital cost of money as an allowable contract cost. In that year, the Cost Accounting Standards Board issued Cost Accounting Standard (CAS) 414, COST OF MONEY AS AN ELEMENT OF THE COST OF FACILITIES CAPITAL. The purpose of the CAS 414 is to improve cost measurement recognizing the cost of capital committed to facilities as a contract cost. The standard also provides guidance on allocating the cost of contractor investment in negotiated Defense prime contracts and subcontracts.

CAS 414 resulted from concerns about the Defense industrial base, which, according to several Government and industry studies, was antiquated and shrinking. The percentage of each sales dollar invested in plant and equipment by Defense contractors was running substantially below the national average for commercial contracts. One of the reasons for the below average level of investment was that the financial return on non-military investments was significantly greater; therefore, prudent investors would not invest capital in Defense oriented facilities and equipment. Through the use of CAS 414, and its implementing regulations, the Government hoped to achieve three outcomes:

1. Reward contractors for facility investment
2. Motivate increased productivity and reduced costs through the use of modern manufacturing technology
3. Promote other performance efficiencies in Defense contracts

In 1980, the Cost Accounting Standards Board issued Cost Accounting Standard 417, COST OF MONEY AS AN ELEMENT OF THE COST OF CAPITAL ASSETS UNDER CONSTRUCTION. The purpose of CAS 417 is to establish criteria for the measurement of the cost of money attributable to capital assets under construction, fabrication, or development as an element of the cost of those assets. In issuing CAS 417, the CAS Board hoped to:

1. Improve cost measurement by providing for recognition of cost of contractor investment in assets under construction
2. Provide greater uniformity in accounting for asset acquisition costs.

11.1.2 Basics of Cost Allowability

Introduction

FAR 31.205-20

Cost of facilities capital investment has been, at times, confused with interest expense. The imputed cost of money rate, used to calculate cost of money, is NOT interest expense as defined in FAR 31.205-20, INTEREST AND OTHER FINANCIAL COSTS. The cost of capital is determined without regard to whether money is to be borrowed or taken from equity (e.g., the firm's savings from past profits). The resulting cost of money is NOT a form of interest on borrowings.

Allowable Cost

FAR 31.205-10

Initially, “cost of money” was an allowable cost only on DoD contracts and Defense related contracts of the National Aeronautics and Space Administration (NASA) and the Department of Energy (DOE). Today, FAR 31.205-10 specifically allows recognition of cost of money on all contracts even when the contract is NOT subject to CAS, if:

1. The contractor's capital investment is developed, measured and allocated in accordance with CAS 414.
2. The contractor maintains adequate records demonstrating compliance with CAS 414.
3. The estimated facilities capital cost of money is specifically identified or proposed in cost proposals relating to the contract under which this cost is to be claimed; and
4. The limits in FAR 31.205-52, Asset Valuations Resulting from Business Combinations, are not exceeded.

FAR 31.205-52

Note that FAR 31.205-10 has separate coverage of the allowability of cost of money as an element of the cost of capital assets under construction.

(continued on next page)

11.1.2 Basics of Cost Allowability

(continued)

Cannot Use as
a Profit Base

While the calculation of profit will be covered in the next chapter, it is important to note here that cost of money values are NOT included in the profit calculation base.

FAR 15.903(c)

The Cost Accounting Standards are silent on the relationship between cost of money and profit. However, the FAR 15.903(c) specifically excludes cost of money from the base for calculating profit or fee objectives.

Recognition of contractor facilities capital employed in the actual profit or fee objective calculation is subject to agency FAR supplements and will be addressed in the next chapter.

11.1.3 Facilities Capital Cost of Money Under CAS 414 and 417

Differentiating
between the
Cost of Money

CAS 414 costs are based on the net book value of all assets used in the general operation of the firm with which you are contracting. Costs are applied to individual contracts through the use of Facilities Capital Cost of Money Factors. As a buyer, you must understand how these factors are developed and how you should apply them in cost analysis and negotiation. Because of their importance and your active role in factor application, the remainder of the chapter will examine the development and use of facilities capital cost of money factors under CAS 414.

CAS 417 deals exclusively with calculating the cost of money as an element of the cost of capital assets under construction. The dollars may be significant, but the value of assets under construction typically is relatively small compared to the total net book value of facilities used in the general operation of the firm. In addition, while the CAS 417 cost of capital assets under construction is only accumulated while assets are under construction, the costs are charged as part of contract depreciation over the depreciable life of the asset. As a result, analysis of CAS 417 costs becomes a part of the complex process of asset valuation and depreciation. If you have questions regarding CAS 417 costs, contact the cognizant government auditor.

11.2 DEVELOPING FACILITIES CAPITAL COST OF MONEY

Overview

Overview

This section presents:

- the Facilities Capital cost of Money Factors Computation form
- a step-by-step procedure for completing this form
- a discussion of the Historical and Projected methods of net book value calculation

Maps in This Section

This section includes the following maps:

- Developing Facilities Capital Cost of Money Factors
- Historical and Projected Methods of Net Book Value Calculation

11.2.1 Developing Facilities Capital Cost of Money Factors

Introduction

The contractor is responsible for developing the facilities capital cost of money factors using the Form CASB-CMF. When overhead rates are audited by government auditors, facilities capital cost of money factors are typically reviewed at the same time. When there is no government audit review or the auditor raises a question about the preparation of the form, you may be called upon to review development procedures and specific calculations.

Procedure for Factor Development

Any review or analysis of cost of money factor development should examine the procedures used by the contractor in each step of development through completion of the Form CASB-CMF.

The form has seven columns. The following table briefly describes the steps of cost of money factor development and relates each step to the appropriate column of the form.

FORM CASB-CMF							
FACILITIES CAPITAL COST OF MONEY FACTORS COMPUTATION							
CONTRACTOR: BUSINESS UNIT:				ADDRESS:			
COST ACCOUNTING PERIOD:		1. APPLICABLE COST OF MONEY RATE ____ 8 ____ %	2. ACCUMULATION & DIRECT DISTRI- BUTION OF N.B.V	3. ALLOCATION OF UNDISTRIBUTED	4. TOTAL NET BOOK VALUE	5. COST OF MONEY FOR THE COST ACCOUNTING PERIOD	7. FACILITIES CAPITAL COST OF MONEY FACTORS
BUSINESS UNIT FACILITIES CAPITAL	RECORDED	\$9,000,000	BASIS OF ALLOCATION	COLUMNS 2 + 3	COLUMNS 1 x 4	IN UNITS(S) OF MEASURE	COLUMNS 5 / 6
	LEASED PROPERTY	\$1,000,000					
	CORPORATE OR GROUP	\$500,000					
	TOTAL	\$10,500,000					
	UNDISTRIBUTED	\$4,500,000					
	DISTRIBUTED	\$6,000,000					
OVER-HEAD POOLS	Engineering	\$4,500,000	\$3,000,000	\$7,500,000	\$600,000	\$2,000,000	.30000
	Manufacturing	\$1,000,000	\$1,000,000	\$2,000,000	\$160,000	\$600,000	.26667
	Technical Computer		\$500,000	\$500,000	\$40,000	2,250 hrs	\$17.77778
G&A EXPENSE POOLS	G&A Expense	\$500,000		\$500,000	\$40,000	\$30,000,000	.00133
TOTAL		\$6,000,000	\$4,500,000	\$10,500,000	\$840,000	////	////

(continued on next page)

11.2.1 Developing Facilities Capital Cost of Money Factors

(continued)

COST OF MONEY FACTOR DEVELOPMENT	COLUMN NUMBER AND TITLE	FACTOR DEVELOPMENT ACTION
STEP 1: DETERMINE THE APPROPRIATE COST OF MONEY RATE	Column 1, Cost of Money Rate	Use the current cost of money rate as determined by the Secretary of the Treasury, under PL 92-40. The rate is published twice a year in the Federal Register. The published rate must be used for current and future periods. THE RATE IS NOT NEGOTIABLE.
STEP 2: ACCUMU- LATE NET BOOK VALUE (NBV)	Column 2, Accumula- tion & Direct Distribu- tion of NBV (Net Book Value) Section on Business Unit Facilities Capital	General: Use the historical or projected net book value of assets. Unless there are major fluctuations in capital expenditures during the year, the contractor normally would use a two-point average (beginning of the year, end of the year). If fluctuations exists, consider using a five-point average (first day of the year, end of each quarter) or a thirteen-point average (first day of the year, end of each month).
		Recorded: Facilities capital items owned by the contractor, carried on the books of the contracting business unit, and used in regular business activity.
		Leased Property: Capitalized value of facilities capital lease items for which the constructive cost of ownership is allowed in lieu of rental costs.
		Corporate or Group: Business unit's allocated share of corporate owned or leased facilities.
		Total: Sum of the NBV for recorded, leased, and the allocated share of corporate or group facilities.
		Undistributed: Sum the NBV dollars, in the above total, that are not identified as solely applicable to a specific indirect cost pool.
		Distributed: Sum the NBV dollars, in the above total, that are identified as solely applicable to a specific indirect cost pool.

(continued on next page)

11.2.1 Developing Facilities Capital Cost of Money Factors

(continued)

COST OF MONEY FACTOR DEVELOPMENT	COLUMN NUMBER AND TITLE	FACTOR DEVELOPMENT ACTION
STEP 3: ALLOCATE NBV TO OVERHEAD POOLS	Column 2, Accumulation & Direct Distribution of NBV	Identification of Distributed NBV with the Appropriate Indirect Cost Pools. In this section, identify each of the contractor's overhead pools and the facilities cost of capital solely identified with each pool. The sum of the NBV identified with all pools must equal the sum of all distributed NBV dollars in Step 2.
	Column 3, Allocation of Undistributed	Identification of Undistributed NBV with the Appropriate Indirect Cost Pools. Using the regular method , allocate the undistributed NBV identified in the previous step to the appropriate indirect cost pools by using a method agreeable to both parties. Examples include formulas, use charges, or any other method that equitably distributes the NBV. An alternate method , which places all undistributed NBV in G&A, may be used if two conditions are met: 1) the depreciation or amortization generated by these assets must be immaterial, and 2) the results must not differ materially from the regular procedure. The method used must be consistent with the method used to allocate depreciation costs to indirect cost pools, and the total undistributed must equal the sum of all undistributed NBV dollars in Step 2.
STEP 4: SUM NBV FOR EACH POOL	Column 4, Total Net Book Value	By adding Columns 2 and 3, total the distributed and undistributed NBV by indirect cost pool. The total is the NBV associated with each pool. The total of Column 4 must equal total NBV from Step 2.

(continued on next page)

11.2.1 Developing Facilities Capital Cost of Money Factors

(continued)

COST OF MONEY FACTOR DEVELOPMENT	COLUMN NUMBER AND TITLE	FACTOR DEVELOPMENT ACTION
STEP 5: CALCULATE THE COST OF MONEY FOR EACH POOL	Column 5, Cost of Money for the Cost Accounting Period	The cost of money for the cost accounting period by overhead pool is determined by multiplying the cost of money rate in Column 1 by each pool NBV in Column 4.
STEP 6: IDENTIFY POOL ALLOCATION BASE	Column 6, Allocation Base for the Period	The allocation base for each cost of money pool must be the same base used to allocate the related overhead pool to various contracts. The contractor's CAS Disclosure Statement should disclose whether the cost of money is included in the G&A Expense allocation base.
STEP 7: CALCULATE FACILITY COST OF MONEY FACTORS	Column 7, Facility Capital Cost of Money Factors	The factor is the result of dividing the cost of money in Column 5 by the allocation base in Column 6. The factor calculation must be carried out five decimal places.

11.2.2 Historical and Projected Methods of Net Book Value Calculation

Introduction

The key element in the cost of money calculation is the **net book value (NBV)**. Normally, you would request an audit of the proposed cost of money factors with special attention to the accuracy of the proposed net book values.

There are two methods available for determining net book value:

- Historical method
- Projected method

Historical Method of NBV Calculation

The historical method is the simplest to prepare and evaluate. The underlying assumption in the historical method is that the net book values have been and will continue to be relatively unchanged. As a result, only one Form CASB-CMF is required no matter how many periods are forecast. The primary tasks for Government review include:

1. Verification of net book value of assets to contractor records.
2. Verification that asset allocation to burden centers is appropriate and in accordance with procedures used in allocation of depreciation expense for the same facilities.
3. Verification of the allowability of the costs used to develop the factors.
4. Verification of the actual calculations used to develop the factors.

(continued on next page)

11.2.2 Historical and Projected Methods of Net Book Value Calculation

(continued)

Projected Method

The projected method uses the contractor's estimates of future net book values. Since change is predicted, a separate Form CASB-CMF is required for each accounting period forecast. As with future depreciation projections, there are three primary parts that make up each NBV projection:

1. The NBV of current assets that will be in service during the projected accounting period.
2. A projection of new assets that will be acquired during the projected accounting period.
3. A projection of current assets or projected new assets that will be disposed of during the projected accounting period.

Since the projected method uses the same approach as indirect cost forward pricing rate projections, care must be taken to insure that the net book values and associated depreciation expenses are based on the same assumptions. If NBV is projected to increase, indirect cost depreciation expense should also increase. If NBV is projected to decrease, depreciation expense should also decrease. It would not be logical for the projections of NBV for cost of money purposes to increase while projections for depreciation expenses decrease or remain constant.

Under this method, the primary tasks for Government review are:

1. Verification of historical bases for projections of the NBV of assets.
2. Review of contractor support for projections of asset adjustments, including identification of assets to be acquired or disposed of, the time phasing of asset changes, and the capital budget considering these adjustments.
3. Verification of the allowability of the projected costs used to develop the factors.
4. Review of the methods and rationale used to project burden center bases for the projected periods.
5. Verification of the actual calculations used to develop the factors.

11.3 APPLYING FACILITIES CAPITAL COST OF MONEY TO SPECIFIC CONTRACTS

Overview

Overview	<p>This section covers:</p> <ul style="list-style-type: none">• applying Facilities Capital Cost of Money factors to specific contracts• DD Form 1861 for developing cost objectives
Maps in This Section	<p>This section includes the following maps:</p> <ul style="list-style-type: none">• Applying Facilities Capital Cost of Money Factors to Specific Contracts• DD Form 1861

11.3.1 Applying Facilities Capital Cost of Money Factors to Specific Contracts

Introduction

Having learned about cost of money factor computation, the next step is to learn about their proper use on individual proposals. The offeror will include facilities capital cost of money in the proposal. In preparation for negotiation, you will have to calculate the facilities capital cost of money based on your cost analysis. In developing your estimate, you may use a computer spreadsheet, an informal work sheet, or, in the DoD, the DD Form 1861, Contract Facilities Capital & Cost of Money.

Applying Factors to Appropriate Bases

To be considered for application of facilities capital cost of money, the contractor must include the cost in the proposal. The calculations are normally found at the end of the proposed cost breakdown, after profit. The following contractor proposal, using the cost of money factors from the CASB-CMF form shown on page 11-10, illustrates how the proposed cost of money appear.

COST ELEMENT	HOURS/ DOLLARS	RATE	COST
Engineering Direct Labor	250 hrs	\$38.05 per hour	\$ 9,512.50
Engineering Overhead		250% ENG D/L \$	\$ 23,781.25
Manufacturing Direct Labor	150 hrs	\$18.19 per hour	2,728.50
Manufacturing Overhead		315% D/L \$	\$ 8,594.78
Technical Computer Direct Cost	75 hrs	\$200.00 per computer hour	15,000.00
Technical Computer Overhead		\$300 per hour	22,500.00
Direct Material Cost	\$256,890		256,890.00
Subtotal			\$ 339,007.03
General & Administrative Expense		15% of subtotal	\$ 50,851.05
Total Cost Less Cost of Money			\$ 389,858.08
Profit		15% Total cost less cost of money	\$ 58,478.71
Total Cost Plus Profit Less Cost of Money			\$ 448,336.79

11.3.1 Applying Facilities Capital Cost of Money Factors to Specific Contracts (continued)

Applying Factors
to Appropriate
Bases

COST OF MONEY CALCULATIONS	BASE	RATE	COST
Engineering	\$9,512.50	.30000	\$ 2,853.75
Manufacturing	\$2,728.25	.26667	727.54
Technical Computer	75 hrs	\$17.77780	1,333.34
General & Administrative	\$339,007.03	.00133	450.88
Total Cost of Money			\$ 5,365.51
Total Cost Plus Profit Less Cost of Money			\$ 448,336.79
Grand Total Including Cost of Money			\$ 463,025.00

If you carefully review the calculations, you can see that the cost of money factors are applied to the same bases as the indirect rates.

11.3.2 DD Form 1861

Facilities Capital Cost of Money Calculation

In the DoD, facilities capital cost of money calculation is part of most cost analyses. As a result, the DoD has created the DD Form 1861, “Contract Facilities Capital Cost of Money”, to provide a uniform format for use by DoD contracting personnel in the development of cost objectives.

The following example demonstrates the use of Government developed allocation base values along with agreed-to cost of money factors and treasury rates in the development of a government negotiation position. Compare the government position with the proposal described earlier in the chapter.

CONTRACT FACILITIES CAPITAL COST OF MONEY			Form Approved OMB no. 0704-0267 Expires Oct 31, 1989
1. CONTRACTOR NAME		2. CONTRACTOR ADDRESS	
3. BUSINESS UNIT			
4. RFP/CONTRACT PIIN NUMBER		5. PERFORMANCE PERIOD	
6. DISTRIBUTION OF FACILITIES CAPITAL COST OF MONEY			
POOL	ALLOCATION BASE	FACILITIES CAPITAL COST OF MONEY	
		FACTOR	AMOUNT
Engineering	\$9,100.00	.30000	\$2,730.00
Manufacturing	\$2,600.00	.26667	693.34
Technical Computer	75 hrs	\$17.77778	\$1,333.34
G&A	\$331,000.00	.00133	440.23
TOTAL			\$5,196.91
TREASURY RATE			8%
FACILITIES CAPITAL EMPLOYED (TOTAL DIVIDED BY TREASURY RATE)			\$64,961.38
7. DISTRIBUTION OF FACILITIES CAPITAL EMPLOYED			
	PERCENTAGE	AMOUNT	
LAND	23%	\$14,941.12	
BUILDINGS	22%	\$14,291.50	
EQUIPMENT	55%	\$35,728.76	
FACILITIES CAPITAL EMPLOYED	100%	\$64,961.38	

DD Form 1861, AUG 87

Supersedes all previous editions of DD Forms 1861-1 and 1861-2, which are obsolete.

(continued on next page)

DD Form 1861

(continued)

Facilities
Capital Cost of
Money
Calculation
(continued)

We will use the DD Form 1861 to demonstrate how one calculates the government objective. As you look at the form, you will find that Section 6 of the form is divided into four columns: pool, allocation base, factor, and amount. The four columns correspond to information that you will need to calculate your cost of money objective.

The **pool column** is used to identify the name of each pool. Identifying the pool by name facilitates calculations by assuring that all appropriate pools are considered and identifying the factor that is used in making each calculation.

The **allocation base** is the base value from *your* negotiation position. If you have more than one negotiation position — such as a minimum, a maximum, and an objective — you would have a different form for each position.

The **factor** is the agreed to cost of money factor from the proposal. If there is a dispute over the appropriate rate, use the rate recommended for use by the government.

The **amount** is the cost of money for each pool computed by multiplying the allocation base column by the factor column.

After all factors are applied to the appropriate base, the amounts are totaled to determine the total facilities capital cost of money applicable to the negotiation position. Note that the government position is \$5,196.91 compared to the \$5,365.51 proposed by the contractor.

Facilities
Employed
Calculation

In most agencies, you will not need to make any additional calculations regarding the facilities capital cost of money applicable to your negotiation position. However, in the DoD, the weighted guidelines method of profit analysis gives special consideration to the facilities capital employed on the contract.

(continued on next page)

DD Form 1861

(continued)

Facilities
Employed
Calculation
(continued)

Look back at Step 5 in calculating the Facilities Capital Cost of Money Factors. To calculate the cost of money for the accounting period, you multiplied the NBV, Column 4, by the cost of money rate, Column 1, to determine the cost of money for the accounting period, Column 5. To estimate the capital employed on a particular contract, the DoD buyer reverses the process.

After calculating the cost of money applicable to a particular position, the buyer divides by the cost of money rate to estimate the capital employed on the contract. The Treasury rate used here is the same rate as used on the Form CASB-CMF.

For example, the total facilities capital cost of money applicable to the proposal (\$5,196.91) would be divided by the current treasury rate (8 percent) from the Form CASB-CMF to estimate the net book value of the facilities capital employed (\$64,961.38).

Distribution of
Facilities
Capital
Employed

To encourage contractor investment in productive facilities, the DoD weighted guidelines method of profit analysis provides different profit weights for each different type of facility, land, buildings, and equipment. To facilitate profit calculations, one more series of calculations is required before the facilities capital employed can be used in DoD weighted guidelines. Section 7 is used to estimate the amount of each type of facility employed on the contract.

The percentage assigned to each type of facility in Section 7 is equal to the overall percentage of contractor NBV dollars invested in that type of facility. Percentages are proposed by the contractor and subject to government review. Of course, the sum of all percentages must equal 100 percent.

To estimate the value of each type of facility employed on the contract, multiply the total facilities capital employed by the appropriate percentage. The result is the estimated amount of that type of facility employed on the contract. The sum of all three amounts must equal the total facilities capital employed. Some adjustment may be required to compensate for rounding error in the various calculations.

End-of-Chapter Vignette

Andrew is starting to understand what an imputed cost is, but the five digit factors are throwing him. Give him a hand.

In order to develop cost of money factors, you need a net book value (NBV) figure by overhead pool and an overhead base value. In WEC, the NBV's are not an issue. Therefore, the differences in factors are due to different base values. Using the base values in the proposal, audit report, and ACO report, calculate the 19X9 cost of money (COM) factors for engineering.

	NBV	COST OF MONEY @ 8%	OVERHEAD BASE	COM FACTOR
Proposed	\$2,650,000			
Audit	\$2,650,000			
FPRA	\$2,650,000			

Chapter Vignette

What Is a Reasonable Profit?

What is a reasonable profit for this job? Andrew is gaining in confidence, but who is to say what is reasonable? Kay has told him to use a structured approach for determining profit. He has heard other buyers talk about “rewarding” performance and assessing risk, but he does not have a feel for what is too high or too low. Kay has sent him “back to the books” to study developing a reasonable profit or fee position, and asked him to prepare a profit position and a supporting rationale.

Course Learning Objectives

At the end of this chapter, you will be able to:

- identify general factors for establishing profit negotiation objectives
- calculate a profit/fee objective using the NASA structured approach
- calculate a profit/fee objective using DoD Weighted Guidelines

Chapter Overview

Overview

When you must perform a cost analysis, you must also analyze contract profit/fee.

FAR 15.902

To limit the effects of personal subjectivity and biases, FAR 15.902 requires that contracting officers base their prenegotiation objectives for contract profit or fee on a structured analysis of several elements.

In this chapter, you will learn about some of the approaches used within the Government to develop a negotiation objective for profit/fee and some of the elements that influence the profit/fee objective. You will cover the NASA Structured Approach and DoD Weighted Guidelines in detail.

Maps in This Chapter

This chapter contains the following maps:

12.1	GENERAL FACTORS.....	12-4
12.1.1	Required Structured Analysis	12-5
12.1.2	Contractor Profit Motivation	12-6
12.1.3	Factors to Consider.....	12-7
12.2	NASA STRUCTURED APPROACH.....	12-9
12.2.1	NASA Form 634	12-10
12.2.2	Exemptions.....	12-16
12.3	DoD WEIGHTED GUIDELINES	12-17
12.3.1	DoD Weighted Guidelines.....	12-18
12.3.2	Weighted Guidelines Calculations.....	12-21
12.3.3	Exemptions from Weighted Guidelines.....	12-37

(continued on next page)

12.1 GENERAL FACTORS

Section Overview

Overview

FAR 15.901(a)

Profit or fee is the total dollar amount paid to the firm for contract performance *over and above allowable costs*. Just as actual costs may vary from estimated costs, the contractor's actual realized profit or fee may vary from negotiated profit or fee, because of such factors as:

- efficiency of performance
- incurrence of unallowable costs
- contract type

In this section, you will learn about four general factors that will effect your development of contract profit/fee objectives:

- requirements for use of a structured approach to profit/fee analysis
 - the importance of profit motivation
 - elements to be considered in analysis
 - other factors that effect profit/fee analysis and objective development
-

Maps in This Section

This section includes the following maps:

- Required Structured Analysis
 - Contractor Profit Motivation
 - Factors to Consider
-

12.1.1 Required Structured Analysis

Introduction

FAR 15.902(a)

Your agency **MUST** establish a structured approach for determining the profit or fee prenegotiation objectives, if the agency:

- Makes noncompetitive contract awards over \$100,000 and
- The total value of those contracts is \$50 million or more.

If your agency has a structured approach, you **MUST** use it to analyze the profit/fee. If your agency has **NOT** prescribed a structured approach, you **MUST** nonetheless consider the factors in FAR 15.905-1 (summarized on pages 12-7 through 12-8 of this text/reference).

Each Agency May Develop Its Own Approach

The FAR only prescribes the factors that must be considered in establishing the profit/fee objective. It does not prescribe a Government-wide approach to profit/fee analysis. An agency may develop its own structured approach or use the approach of another agency if that approach will meet its needs.

Exemptions May Be Authorized Where Approach Is Inappropriate

FAR 15.905-1

Agencies may exempt certain types of contract actions from the application of the agency's structured approach to profit/fee analysis. However, even in situations exempted from application of your agency's structured approach, you must follow the general FAR requirements for profit/fee objective development.

You must examine your agency's guidelines to determine what specific exemptions apply. Typical exemptions include:

- Architect-engineer contracts
- Construction contracts
- Contracts primarily requiring delivery of material supplied by subcontractors
- Termination settlements
- Cost-plus-award-fee contracts

12.1.2 Contractor Profit Motivation

Introduction	The underlying assumption of Government use of structured approaches to profit/fee analysis is that contractors are motivated by profit. Structured approaches provide a discipline for ensuring that all relevant factors are considered in developing Government profit/fee negotiation objectives.
--------------	---

Profit/Fee Analysis Goals	It is in the Government's best interest to offer contractor's opportunities for financial rewards sufficient to:
---------------------------	--

FAR 15.901(b)

1. Stimulate efficient contract performance.
 2. Attract the best capabilities of qualified large and small businesses.
 3. Maintain a viable industrial base to meet public needs.
-

Administrative Restrictions on Profit/Fee Reward	If the Government is to use profit/fee to motivate contractor performance and achieve the above goals, practices primarily intended to reduce profit/fee or diminish the impact of profit analysis are NOT in the Government's best interest. The following are practices that are inconsistent with profit/fee goals:
--	--

1. Negotiations aimed at reducing profit/fee without consideration of the profit function.
 2. Negotiation of extremely low profits/fees.
 3. Use of historical average profit/fee rates without regard to the unique circumstances of the immediate negotiation.
 4. Automatically applying predetermined profit/fee percentages without regard to the unique circumstances of the immediate negotiation.
-

Profit/Fee Ceiling	FAR 15.901(c) prohibits administrative profit/fee ceilings and the use of administrative procedures that could be interpreted by contractors as de facto ceilings. However, there are statutory limits on contract fee in certain situations. Contract fee cannot exceed applicable statutory limits.
--------------------	---

FAR 15.901(c)

TYPE OF CONTRACT	STATUTORY FEE LIMIT
Experimental, developmental, or research work performed under a cost-plus-fixed-fee contract	15% of estimated contract cost
All other cost-plus-fixed-fee contracts	10% of estimated contract cost

12.1.3 Factors to Consider

Factors

FAR 15.905-1

While each agency is responsible for developing their own structured approach, the FAR stipulates factors that must be considered unless they are clearly inappropriate or not applicable.

FACTOR	GREATER PROFIT/FEE OPPORTUNITY FOR OFFERORS WHO...	ELEMENTS OF CONSIDERATION
Contractor Effort (i.e. complexity of the work and resources required for contract performance)	Undertake contracts requiring a high degree of professional and managerial skill and whose skills, facilities, and technical assets can be expected to lead to efficient contract performance	Material: Managerial and technical effort necessary to obtain materials, given the: <ol style="list-style-type: none"> 1. Complexity of items purchased 2. Number of purchase orders/subcontracts required 3. Need for source development 4. Complexity of purchase orders/ subcontracts
		Direct Labor: Contribution to contract performance, given the: <ol style="list-style-type: none"> 1. Diversity of labor types required 2. Amount and quality of supervision & coordination needed
		Indirect Cost <ol style="list-style-type: none"> 1. Give indirect labor the same profit consideration as direct labor 2. Evaluate other indirect costs on complexity and contribution to contract performance
		General Management <ol style="list-style-type: none"> 1. Give indirect labor the same profit weight as comparable direct labor 2. Evaluate management effort on complexity and involvement required 3. Evaluate other cost elements on contribution to contract performance
Cost Risk	Assume a proportionately greater degree of cost responsibility and associated risk	Consider: <ol style="list-style-type: none"> 1. Type of contract 2. Reliability of the cost estimate 3. Dollar value, complexity, and duration of the work
Federal Socioeconomic Programs	Have displayed unusual initiative in support of socioeconomic programs	Consider contractor support of programs for: <ol style="list-style-type: none"> 1. Small businesses 2. Small businesses owned by disadvantage individuals 3. Handicapped sheltered workshops 4. Labor surplus areas 5. Energy conservation

(continued on next page)

12.1.3 Factors to Consider

(continued)

FACTOR	GREATER PROFIT/FEE OPPORTUNITY FOR OFFERORS WHO...	ELEMENTS OF CONSIDERATION
Capital Investments	Have made investments that will facilitate efficient and economical contract performance	Consider: 1. The amount of contractor investment 2. The effect of that investment on efficient and economical contract performance
Cost Control and Other Past Accomplishments	Have demonstrated an ability to perform similar tasks effectively and economically	Consider: 1. Measure taken to improve productivity 2. Other cost-reduction accomplishments that will benefit the Government in follow-on contracts
Independent Development	Have undertaken relevant independent development without Government assistance	Consider: 1. Independent development efforts undertaken by the contractor 2. Relevance of the efforts to the contract end item 3. Direct or indirect cost recovery from the Government
Additional Factors	Actively support agency program objectives	Consider any additional factors prescribed by your agency for this purpose

Other Considerations

FAR 15.903

Excluding Facilities Capital Cost of Money Included in Profit. FAR 15.903 requires that you base profit/fee prenegotiation objectives on the prenegotiation cost objectives. However, exclude any dollar amount for facilities cost of capital (whether allowable or not) before applying profit/fee factors.

FAR 15.901(c)

Changes to Existing Contracts. The FAR requires that you consider profit objectives based exclusively on the contract action being negotiated. The only exception is the negotiation of contract changes. When contract changes are negotiated, the base contract profit rate may be used as the negotiation objective if BOTH of the following conditions are met:

- The change must be for the *same type and mix of work* as the base contract
- The change must be of *relatively small value* compared to the total contract

If both conditions are not met, the profit rate must be individually evaluated.

12.2 NASA STRUCTURED APPROACH

Section Overview

Overview

The NASA structured approach is described here as an example of similar structured approaches used by several agencies to evaluate profit on contracts with commercial firms.

The NASA Form 634, Structured Approach Profit/Fee Objective, contains the basic FAR factors covered above and assigns “normal” profit/fee weight ranges. The information on the form, along with implementing guidance in NASA FAR SUP 18-15.970, provide a sound basis for a structured profit/fee analysis.

Maps in This Section

This section contains the following maps:

- NASA Form 634, Structured Approach Profit/Fee Objective
 - Exemptions from NASA Structured Approach
-

12.2.1 NASA Form 634**Contractor
Effort**

Note that the body of the form is divided into two major sections for profit/fee objective development: contractor effort and other factors.

FAR 15.905-1(a)

The evaluation of contractor effort follows the general elements of contractor effort prescribed in FAR 15.905-1(a) and outlined in the chart above. The one addition is a section on other costs. Other costs include all direct costs other than direct material and direct labor. Profit/fee consideration of other costs should include:

- Nature of each such cost
- Contribution of the cost element to contract performance

Elements of Contractor Effort. The elements of contractor effort are identified in the following chart along with information on the appropriate profit/fee calculation base and profit weight range.

CONTRACTOR EFFORT CATEGORY	PROFIT/FEE COST BASE	WEIGHT RANGE	WEIGHT RANGE MIDPOINT
Material Acquisition	Material Costs	1% to 4%	2.5%
Direct Labor	Direct Labor Costs	4% to 12%	8.0%
Overhead	Overhead Costs	3% to 8%	5.5%
Other Costs	Other Direct Costs	1% to 3%	2.0%
General Management (G&A)	General & Administrative Expense	4% to 8%	6.0%

The sum of all the profit/fee bases should equal total contract cost.

Note that the areas with greatest potential for contractor contribution to effective contract completion have the highest weight ranges. Material acquisition, for example, has a low weight range because the bulk of the contract contribution is shifted to suppliers and subcontractors.

(continued on next page)

12.2.1 NASA Form 634

(continued)

NASA
Form
634

NASA National Aeronautic and Space Administration		Structured Approach Profit/Fee Objective		
CONTRACTOR				RFP/CONTRACT NO.
BUSINESS UNIT				CONTRACT TYPE
ADDRESS				
CONTRACTOR EFFORT				
1. COST CATEGORY	GOVERNMENT'S COST OBJECTIVE (a)	WEIGHT RANGE (b)	ASSIGNED WEIGHT (c)	WEIGHTED PROFIT/FEE (a) x (c) (d)
MATERIAL ACQUISITION		1% TO 4%		
DIRECT LABOR		4% TO 12%		
OVERHEAD		3% TO 8%		
OTHER COSTS		1% TO 3%		
GENERAL MANAGEMENT (G&A)		4% TO 8%		
1.A TOTAL				
2. OTHER FACTORS				
FACTOR	MEASUREMENT BASE (a)	WEIGHT RANGE (b)	ASSIGNED WEIGHT (c)	WEIGHTED PROFIT/FEE 1.A ((a) x (c)) (d)
COST RISK	TOTAL COST OBJECTIVE 1.A (a)	0% TO 7%		
INVESTMENT		-2% TO +2%		
PERFORMANCE		-1% TO +1%		
SOCIO-ECONOMIC PROGRAMS		-5% TO +5%		
SPECIAL SITUATIONS				
2.A TOTAL OTHER FACTORS				
3. SUBTOTAL PROFIT/FEE LINES (1.A) + (2.A)				
4. LESS FACILITIES CAPITAL COST OF MONEY				-
5. TOTAL PROFIT/FEE OBJECTIVE LINE (3) - (4)				

NASA FORM 634 FEB 80

(continued on next page)

12.2.1 NASA Form 634, Structured Approach Profit/Fee Objective

(continued)

Contractor
Effort

(continued)

Contractor Effort Profit/Fee Objective. To develop a profit objective for contractor effort, you would follow a five step procedure:

- Step 1:** Identify the dollars associated with the appropriate cost base in column (a) of NASA Form 634. Remember that the cost base **MUST NOT** include Facilities Capital cost of Money.
- Step 2:** Analyze contractor effort required to perform the contract and assign the objective dollars to the appropriate category identified in the table above. Contractor effort in each category will serve as a base for profit calculation.
- Step 3:** Assign an appropriate profit weight from the prescribed weight range. Average effort should receive an average weight. Document your rationale for the weight assigned in column (c).
- Step 4:** Multiply each assigned weight by the appropriate base to calculate the related profit dollars in column (d).
- Step 5:** Sum the profit dollars to determine the total profit/fee related to contractor effort in Item 1.A, column (d).

Other Factors

The remainder of the profit/fee analysis factors identified in the FAR are included in the Other Factors section of the NASA Form 634. Note that each the assigned weight is multiplied by figure in block 1.A, "Total Cost Objective." Remember that Facilities Capital Cost of Money **CANNOT** be used as a base for profit/fee calculation.

ANALYSIS FACTOR	TOTAL GOV'T COST OBJECTIVE*	WEIGHT RANGE	WEIGHT RANGE MIDPOINT
Cost Risk	Total	0% to .5%	0.0%
CPFF		.5% to 3%	1.8%
CPIF		3% to 7%	5.0%
Fixed-Price	Contract	-2% to +2%	0.0%
Investment (Facilities & Payments)		-1% to +1%	0.0%
Performance (Cost Control and Past Accomplishments)	Cost	-1% to +1%	0.0%
Socioeconomic Programs		-.5% to +.5%	0.0%
Special Situations		Unspecified	N/A%

***EXCLUDING FACILITIES CAPITAL COST OF MONEY**

(continued on next page)

12.2.1 NASA Form 634, Structured Approach Profit/Fee Objective

(continued)

Other Factors

Cost Risk. Normal weight ranges are based on the type of contract. Assignment of a weight in a given range is based on the amount of risk assumed.

For example, cost-plus-fixed-fee (CPFF) contracts rarely rate a profit/fee weight greater than 0.0 percent. CPFF contracts that include cost risk features may rate a weight of up to .5 percent. Cost-plus-incentive-fee (CPIF) contracts account for the remainder of the range.

For fixed price contracts, select a weight that corresponds to the price risk assumed and the item required. For example, you might assign a weight of 7 percent to a firm fixed-price contract for development of a prototype infra-red sensor; you might assign a weight of only 3 percent for a firm fixed-price contract to produce spare parts identical to those manufactured under prior contracts. Normally rate fixed-price incentive (FPI) contracts at the lower end of the weight scale.

Investment. A plus or minus weight can be assigned. If use of the facilities will significantly contribute to lowering the total contract cost, assign a plus weight to contractors who furnish their own facilities. Assign a negative weight to contractors who rely on the Government to furnish or finance required facilities.

However, do NOT adjust profit if NASA would realize no significant differential benefit from using the contractor's facilities or loss from furnishing a Government facility. For instance, it would little profit NASA to have a contractor invest in a launch pad if NASA already owns an available launch. In that case do NOT adjust profit downward even though NASA is furnishing the facility.

Also, base the weight for investment on the extent to which the contractor relies on the Government for day-to-day working capital. This is a function of the nature and frequency of payments to the contractor. If the contractor has received advance payments, reduce profit to reflect the fact that the Government has provided the working capital upfront. Also, reduce profit if the contractor is paid on an unusually frequent basis (e.g., more often than monthly)—with maximum reduction as the contractor's working capital approaches zero. On the other hand, you might adjust profit upwards if the contractor is paid on a less frequent basis than monthly.

(continued on next page)

12.2.1 NASA Form 634, Structured Approach Profit/Fee Objective

(continued)

Other Factors

(continued)

Performance. A plus or minus weight can be assigned. Contractor performance should be evaluated based on product quality, adherence to schedules, efficiency in cost control, accuracy and reliability of previous cost estimates, cooperation with the Government, timely processing of changes, and compliance with contract provisions. Above average achievement merits a plus weight. Below average achievement merits a negative weight.

Socioeconomic Programs. A plus or minus weight can be assigned. Energetic support of Government socioeconomic programs merits a positive weight. Assign a negative weight if there is evidence of failure or unwillingness to support programs.

Special Situations. A plus or minus weight can be assigned. Inventive and developmental contributions are considered here. The importance of the contractor financed development and contractor initiative should be considered in assigning a positive weight. A negative weight may be assigned when commercial spinoff benefits are expected to result from the contract.

Other Factors Profit/Fee Objective. Follow Steps 1 through 5 described under Contractor Effort, except record the total Other Factors profit objective on Item 2A of the NASA Form 634.

Subtotal Profit/Fee

Add Items 1A and 2A to determine the total profit objective derived from application of the structured approach to profit analysis.

Subtract Facilities Capital Cost of Money

When Facilities Capital Cost of Money is allowed as a contract cost, the NASA structured approach requires that you reduce the profit objective by the amount of the cost allowed. The amount allowed is entered on Line 4 of the NASA Form 634 and the adjusted total profit/fee objective is entered on Line 5.

Example

On the next page is an example of what a completed NASA Form 634 might look like for a firm fixed-price contract.

(continued on next page)

12.2.1 NASA Form 634, Structured Approach Profit/Fee Objective

(continued)

NASA
Form
634

NASA National Aeronautic and Space Administration		Structured Approach Profit/Fee Objective		
CONTRACTOR				RFP/CONTRACT NO.
BUSINESS UNIT				CONTRACT TYPE
ADDRESS				
CONTRACTOR EFFORT				
1. COST CATEGORY	GOVERNMENT'S COST OBJECTIVE (a)	WEIGHT RANGE (b)	ASSIGNED WEIGHT (c)	WEIGHTED PROFIT/FEE (a) x (c) (d)
MATERIAL ACQUISITION				
Material	190,000	1% TO 4%	2.5	\$ 4,750
Subcontracts	939,000		2.5	23,475
DIRECT LABOR				
	1,540,000	4% TO 12%	8.0	123,200
OVERHEAD				
	2,183,500	3% TO 8%	5.5	120,093
OTHER COSTS				
ODC	100,000	1% TO 3%	2.0	2,000
GENERAL MANAGEMENT (G&A)	445,725	4% TO 8%	6.0	26,744
1.A TOTAL	5,398,225			\$300,262
2. OTHER FACTORS				
FACTOR	MEASUREMENT BASE (a)	WEIGHT RANGE (b)	ASSIGNED WEIGHT (c)	WEIGHTED PROFIT/FEE 1.A ((a) x (c)) (d)
COST RISK	TOTAL COST OBJECTIVE 1.A (a)	0% TO 7%	5.0	\$ 269,911
INVESTMENT		-2% TO +2%	1.0	53,982
PERFORMANCE		-1% TO +1%	0.5	26,991
SOCIO-ECONOMIC PROGRAMS		-5% TO +5%	- 0 -	- 0 -
SPECIAL SITUATIONS				
2.A TOTAL OTHER FACTORS				\$350,884
3. SUBTOTAL PROFIT/FEE LINES (1.A) + (2.A)				\$651,146
4. LESS FACILITIES CAPITAL COST OF MONEY			-	57,699
5. TOTAL PROFIT/FEE OBJECTIVE LINE (3) - (4)				\$593,447

NASA FORM 634 FEB 80

(continued on next page)

12.2.2 Exemptions

Exempted
Contracts

NASA FAR
Sup 18-15.902

Use of the NASA structured approach is required EXCEPT for:

- Architect-engineer contracts
- Management contracts for operation and/or maintenance of Government facilities
- Construction contracts
- Contracts primarily requiring delivery of material supplied by subcontractors
- Termination settlements
- Cost-plus-award-fee contracts
- Contracts having unusual pricing situations when the approach is determined unsuitable and the exemption is:
 - Justified in writing and
 - Authorized by the procurement officer

Educational
Institutions

It is NASA's policy to NOT pay profit/fee on contracts with educational institutions.

Nonprofit
Organizations

NASA FAR
Sup 18-
15.970(f)

NASA requires use of modified structured approach on contracts with nonprofit organizations. Guidelines are established in NASA FAR Sup 18-15.970(f).

12.3 DOD WEIGHTED GUIDELINES

Section Overview

Overview	<p>This section covers the DoD structured approach to profit/fee analysis—the Weighted Guidelines. These guidelines are implemented using DD Form 1547. The material below shows how to perform the calculations to complete this form properly.</p>
Maps in This Section	<p>This section contains the following maps:</p> <ul style="list-style-type: none">• DoD Weighted Guidelines• Weighted Guidelines Calculations• Exemptions

12.3.1 DoD Weighted Guidelines

Introduction

The NASA structured approach implements FAR requirements by using analysis categories and criteria that closely parallel the format used to present FAR requirements. Prior to 1976, the DoD structured approach to profit/fee analysis, the Weighted Guidelines, was very similar to the approach used by NASA today. In 1976, the same concern about contractor investment in production facilities that caused the Cost Accounting Standards Board to issue CAS 414 caused the DoD to revise its profit policy to give more weight to facilities investment. The Weighted Guidelines were revised again in 1986 to give greater profit for certain types of facilities and consider contractor working capital investment in the performance of fixed-price contracts.

Special Guidance

The basic weighted guidelines described in DFARS Subpart 215.9 places emphasis on providing incentives for manufacturing firms to invest in additional production facilities.

DFARS Subpart 15.9

Some contracts do NOT require substantial facilities investment, such as many contracts for services and research and development (R&D). For these contracts, DFARS provides the contracting officer with two methods of adjusting the weight guidelines to reduce the emphasis on contractor investment:

DFARS 215.971-2(c)(2) 215.971-4(c)(3)

- DFARS provides for increased emphasis on performance risk and elimination of contractor investment consideration. This method is used for services and R&D contracts with firms that have limited facilities investment.

DFARS 215.971-4(c)(2)

- DFARS provides for normal emphasis on performance risk and reduced emphasis on contractor investment. This method is used for contracts with highly facilitated manufacturing firms that are contracting for services or R&D contracts that do NOT require significant investment.

(continued on next page)

12.3.1 DoD Weighted Guidelines

(continued)

Weighted
Guidelines
Form

The DD Form 1547, Record of Weighted Guidelines Application, provides the structure of profit/fee objectives and reporting the amount negotiated (see form on next page). Several organizations have developed computerized versions of the form to assure accurate calculation and reporting. The most widely circulated software is the Air Force Material Command WGM (Weighted Guidance Method). For Air Force Material Command personnel, WGM software is available through contracting channels. For example, the National Contract Management Association (NCMA) currently markets the WGM software.

12.3.1 DoD Weighted Guidelines

(continued)

DD Form
1547

RECORD OF WEIGHTED GUIDELINES APPLICATION						REPORT CONTROL SYMBOL DD - P8L(Q)1751	
1 REPORT NO	2 BASIC PROCUREMENT INSTRUMENT IDENTIFICATION NO				3 SPIIN	4 DATE OF ACTION	
	a PURCHASING OFFICE	b FY	c TYPE PROC INST CODE	d PRISN		a YEAR	b MONTH
5 CONTRACTING OFFICE CODE				ITEM	COST CATEGORY		OBJECTIVE
6 NAME OF CONTRACTOR				13	MATERIAL		
				14	SUBCONTRACTS		
7 DUNS NUMBER		8 FEDERAL SUPPLY CODE		15	DIRECT LABOR		
				16	INDIRECT EXPENSES		
9 DOD CLAIMANT PROGRAM		10 CONTRACT TYPE CODE		17	OTHER DIRECT CHARGES		
				18	SUBTOTAL COSTS (13 thru 17)		
11 TYPE EFFORT		12 USE CODE		19	GENERAL AND ADMINISTRATIVE		
				20	TOTAL COSTS (18 + 19)		
WEIGHTED GUIDELINES PROFIT FACTORS							
ITEM	CONTRACTOR RISK FACTORS		ASSIGNED WEIGHTING	ASSIGNED VALUE		BASE (ITEM 18)	PROFIT OBJECTIVE
21	TECHNICAL		%				
22	MANAGEMENT		%				
23	COST CONTROL		%				
24	PERFORMANCE RISK (COMPOSITE)						
25	CONTRACT TYPE RISK						
26	WORKING CAPITAL		COSTS FINANCED	LENGTH FACTOR	INTEREST RATE		
					%		
	CONTRACTOR FACILITIES CAPITAL EMPLOYED			ASSIGNED VALUE	AMOUNT EMPLOYED		
27	LAND						
28	BUILDINGS						
29	EQUIPMENT						
30	TOTAL PROFIT OBJECTIVE						
NEGOTIATION SUMMARY							
				PROPOSED	OBJECTIVE	NEGOTIATED	
31	TOTAL COSTS						
32	FACILITIES CAPITAL COST OF MONEY (DD Form 1861)						
33	PROFIT						
34	TOTAL PRICE (Line 31 + 32 + 33)						
35	MARK-UP RATE (Line 32 + 33 divided by 31)			%	%	%	
CONTRACTING OFFICER APPROVAL							
36 TYPED / PRINTED NAME OF CONTRACTING OFFICER (Last, First, Middle Initial)				37 SIGNATURE OF CONTRACTING OFFICER		38 TELEPHONE NO	39 DATE SUBMITTED (YYMMDD)
OPTIONAL USE							
96	97		98		99		

DD Form 1547, AUG 87

Previous editions are obsolete

12.3.2 Weighted Guidelines Calculations

Examining
DD Form 1547

For our review of the Weighted Guidelines approach to profit analysis we will divide the DD Form 1547 into the 9-sections identified in the table below:

SECTION	DESCRIPTION	DD FORM 1547 ITEM NUMBERS
1	Identification Information	1 - 12
2	Contractor Effort Cost Category	13 - 20
3	Performance Risk	21 - 24
4	Contract Type Risk	25
5	Working Capital Adjustment	26
6	Facilities Capital Employed	27 - 29
7	Total Profit Objective	30
8	Negotiation Summary	31 - 35
9	Contracting Officer Approval	36 - 39 96 - 99

Section 1,
Identification
Information

These items define DoD requirements for basic information related to the profit/fee analysis including: information about the contractor, the contracting office, and information on the contract itself. Directions for completing these items are contained in Departmental instructions. They will not be considered here.

Section 2,
Contractor
Effort

This section details the Government's prenegotiation objectives by cost category (see, for example, the table on the next page). Facilities capital cost of money is not included in total cost. Item 19 must include General and Administrative (G&A) expenses and all Independent Research and Development (IR&D)/Bid and Proposal (B&P) expenses. The cost information in this section serves as the base for several of the profit/fee calculations made during analysis.

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 2,
Contractor
Effort

ITEM	COST CATEGORY	OBJECTIVE
13	Material	\$ 190,000
14	Subcontracts	939,000
15	Direct Labor	1,540,000
16	Indirect Expenses	2,183,500
17	Other Direct Charges	100,000
18	Subtotal Costs (13 thru 17)	\$ 4,952,500
19	General and Administrative	445,725
20	Total Costs (18 + 19)	\$ 5,398,225

Section 3,
Performance
Risk

DFARS 215.971-2

In this section, the contracting officer is called upon to evaluate risk related to fulfilling of contractual requirements for the supplies or services. Performance risk is subdivided into three types of contractor effort: technical, management, and cost control.

RISK TYPE	EXAMPLES OF FACTORS TO BE ASSESSED
Technical	<ul style="list-style-type: none"> • Technology being applied or developed by the contractor • Technical complexity • Program maturity • Performance specifications and tolerances • Delivery schedule • Extent of Warranty or Guarantee
Management	<ul style="list-style-type: none"> • Contractor's management and control systems • Management involvement required on the contract • Resources applied and value added by the contractor • Contractor support for Federal socioeconomic programs
Cost Control	<ul style="list-style-type: none"> • Expected reliability of cost estimates • Cost reduction initiatives • Cost control and schedule management • Other factors affecting contractor's ability to meet cost targets

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 3,
Performance
Risk

(continued)

Importance Weight. The column on the DD Form 1547 entitled “Assigned Weighting” permits the contracting officer to weight each of the three elements of performance risk, considering its relative importance to contract performance. The total of all weights must always equal 100 percent of all risk.

Example 1. For a development contract, you might assign the following weights:

Technical	50 %
Management	30 %
Cost Control	<u>20 %</u>
	100 %

Example 2. For a production contract, you might assign the following weights:

Technical	20 %
Management	30 %
Cost Control	<u>50 %</u>
	100 %

Select Profit/Fee Value. The column marked “Assigned Value” permits the contracting officer to assign a profit/fee value for each of the three elements of performance risk.

Standard Weight Range — the standard designated range applies to most contracts.

Alternate Weight Range — contracting officers may use the alternate designated range for research and development and service contracts when the contractors require relatively low capital investment in buildings and equipment when compared to the defense industry overall. **If the alternate designated range is used, do not give any profit for facilities capital employed.**

	<u>Normal Value</u>	<u>Designated Range</u>
Standard	4%	2% to 6%
Alternate	6%	4% to 8%

The normal value should be assigned unless there is specific justification for a lower or higher value.

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Weight
Assignments

The tables below identify conditions that may justify assignment of above or below normal weights for technical, management, or cost control effort.

TECHNICAL WEIGHT	
Consider ...	When ...
Maximum Weight	<ul style="list-style-type: none"> • Effort requires development or initial production of a new item, particularly if performance or quality specifications are tight. • Effort requires a high degree of development or production concurrency.
Significantly Above Normal Weight	<ul style="list-style-type: none"> • Effort involves extremely complex, vital efforts to overcome difficult technical obstacles which require personnel with exceptional abilities, experience, and professional credentials.
Above Normal Weight	<ul style="list-style-type: none"> • Contractor is either developing or applying advanced technologies • Items are being manufactured using specifications with stringent tolerance limits • Efforts requires highly skilled personnel or the use of state of the art machinery • Services and analytical efforts are extremely important to the Government and must be performed to exacting standards • Contractor's independent development and investment has reduced the Government's risk or cost • Contractor has accepted and accelerated delivery schedule to meet DoD requirements • Contractor has assumed additional risk through warranty provisions
Below Normal Weight	<ul style="list-style-type: none"> • Acquisition is for off-the-shelf items • Requirements are relatively simple • Technology is not complex • Efforts do not require highly skilled personnel • Efforts are routine • Programs are mature • Acquisition is a follow-on effort or program is mature
Significantly Below Normal Weight	<ul style="list-style-type: none"> • Contract is for routine services • Contract is for production of simple items • Contract is for rote entry of Government furnished information • Contract is for simple operations with GFP

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Weight
Assignments
(continued)

The table below identifies conditions that may justify assignment of above or below normal weights for management and cost control efforts.

MANAGEMENT WEIGHT	
Consider ...	When ...
Maximum Weight	<ul style="list-style-type: none"> • Effort requires large scale integration of the most complex nature • Effort involves major international activities with significant management coordination (e.g., offsets with foreign vendors) • Effort has critically important milestones
Above Normal Weight	<ul style="list-style-type: none"> • Contractor's value-added is both considerable and reasonably difficult • Effort involves a high degree of integration or coordination • Contractor has a substantial record of active participation in Federal socioeconomic programs
Below Normal Weight	<ul style="list-style-type: none"> • Program is mature and many end item deliveries have been made • Contractor adds minimum value to an item • Efforts are routine and require minimal supervision • Contractor provides poor quality, untimely proposals • Contractor fails to provide an adequate analysis of subcontractor costs • Contractor does not cooperate in the evaluation and negotiation of the proposal
Significantly Below Normal Weight	<ul style="list-style-type: none"> • Reviews performed by the field contract administration offices disclose unsatisfactory management and internal control systems (e.g., quality assurance, property control, safety, security) • Effort requires an unusually low degree of management involvement

COST CONTROL WEIGHT	
Consider ...	When ...
Above Normal Weight	<ul style="list-style-type: none"> • Contractor provides fully documented and reliable cost estimates • Contractor has an aggressive cost reduction program that has demonstrable benefits • Contractor uses a high degree of subcontract competition (e.g. aggressive dual sourcing) • Contractor has a proven record of cost tracking and control
Below Normal Weight	<ul style="list-style-type: none"> • Contractor's cost estimating system is marginal • Contractor has made minimal effort to initiate cost reduction programs • Contractor's cost proposal is inadequate • Contractor has a record of cost overruns or other indication of unreliable cost estimates and lack of cost control

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 3,
Performance
Risk

(continued)

Composite Performance Risk. The composite performance risk, Item 24, Assigned Value, is the weighted average calculated using the weight assigned and the value assigned.

	WEIGHT ASSIGNED	VALUE ASSIGNED	WEIGHTED VALUE
TECHNICAL	40%	4.5	1.8%
MANAGEMENT	20%	4.0	.8%
COST CONTROL	40%	3.8	1.5%
COMPOSITE VALUE			4.1%

DFARS

215.971-2(b)(4)

Profit/Fee Base. The composite weight is multiplied by the figure in Item 18, which is the subtotal of costs from Lines 12-19 (i.e., the sum of estimated costs for materials, subcontracts, direct labor, indirect expenses, and other direct charges). Note that this figure excludes G&A (Item 19). The DFARS also specifies that this figure **MUST** exclude (1) independent research and development (IR&D) costs, (2) bid and proposal (B&P) costs, and (3) the facilities cost of capital.

Calculate Performance Risk Profit/Fee Objective

WEIGHTED GUIDELINES PROFIT FACTORS					
ITEM	CONTRACTOR RISK FACTORS	ASSIGNED WEIGHING	ASSIGNED VALUES	BASE (ITEM 18)	PROFIT OBJECTIVE
21.	Technical	40%	4.5		
22.	Management	20%	4.0		
23.	Cost Control	40%	3.8		
24.	Performance Risk Composite		4.1	\$4,952,500	\$203,052

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 4,
Contract Type
Risk

DFARS
215.971-3(c)

The factor focuses on the degree of cost risk accepted by the contractor under various types of contracts.

Select the Appropriate Profit/Fee Range. The designated ranges and the normal values are described in the following table:

CONTRACT TYPE	NOTES	NORMAL VALUE	DESIGNATED RANGE
Firm Fixed-Price			
No Financing	(1)	5%	4% to 6%
With Financing	(2)	3%	2% to 4%
Fixed-Price Incentive			
No Financing	(1)	3%	2% to 4%
With Financing	(2)	1%	0% to 2%
Fixed-Price Redeterminable	(3)	(See Note 3)	(See Note 3)
Cost-Plus-Incentive-Fee	(4)	1%	0% to 2%
Cost-Plus-Fixed-Fee*	(4)	.5%	0% to 1%
Time and Material	(5)	.5%	0% to 1%
Labor-Hour	(5)	.5%	0% to 1%
Firm fixed-price-level-of-effort-term	(5)	.5%	0% to 1%
<p>(1) “No Financing” means that the contract either does not provide progress payments or provides them only on a limited basis, such as financing of first articles. Do not compute a working capital adjustment.</p> <p>(2) “With financing” means progress payments. When progress payments are present, compute a working capital adjustment (Block 26).</p> <p>(3) For the purpose of assigning profit values, treat a fixed-price contract with redeterminable provisions as if it were a fixed-price-incentive contract with below normal conditions.</p> <p>(4) Cost-plus contracts shall not receive the working capital adjustment</p> <p>(5) These types of contracts are considered cost-plus-fixed-fee contracts for the purpose of assigning profit values. They shall not receive higher than normal values within the designated range to the extent that portions of cost are fixed</p>			

Note that fixed-price contracts with financing have a lower range and normal profit/fee than fixed-price contracts without financing. The lower values consider the fact that the contractor assumes less financial risk when the contract provides financing.

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 4,
Contract Type
Risk
(continued)

Assign Profit/Fee Weight. Use the normal weight for each contract type unless a higher or lower weight is justified by the contracting officer. Factors to consider include: length of contract, adequacy of cost data projections, economic environment, subcontracted activity, contractor protection under contract provisions, and contract ceilings and incentives. For example, the CO might assign a weight of 6% to a firm fixed price contract (no progress payments) for development of a prototype space-based anti-missile missile; but assign a weight of only 2% for a firm fixed price contract (with progress payments) to produce helmets identical to those manufactured under prior contracts. Within the range prescribed for that type of contract, the weight for the contract type should be consistent with the weight for performance risk—it would be incongruous to weight contract type risk high but performance risks low, and vice versa.

In determining the appropriate weight to assign, **you MUST assess the extent to which costs have been incurred prior to definitization of the contract action.** Your assessment must consider any reduced contractor risk on both the contract before definitization and the remaining portion of the contract. When costs have been incurred prior to definitization, generally regard the contract type risk to be at the low end of the designated range. If a substantial portion of the costs have been incurred prior to definitization, you may assign a value as low as 0%, regardless of contract type.

12.3.2 Weighted Guidelines Calculations

(continued)

CONTRACT TYPE RISK WEIGHT	
Consider ...	When ...
Above Normal Weight	<ul style="list-style-type: none"> • There is minimal cost history • Long-term contracts do not have provisions protecting the contractor, particularly when there is considerable economic uncertainty • Incentive provisions (e.g., cost and performance incentives) place a high degree of risk on the contractor • Contract is for FMS sales (other than those under DoD cooperative logistics support arrangement or those made from U.S. Government inventories or stocks) where the contractor can demonstrate that there are substantial risks above those normally present in DoD contracts for similar items.
Below Normal Weight	<ul style="list-style-type: none"> • Contract is for a very mature product with extensive cost history • Contract is for a relatively short term • Contractual provisions substantially reduce the contractor's risk • Incentive provisions place a low degree of risk on the contractor

Profit/Fee Base. Contract Type Risk is multiplied by the same based used to calculate the profit/fee objective for performance risk, Item 18.

Calculate Cost Risk Profit/Fee Objective. For a cost-plus-incentive contract with normal risk and the cost structure developed earlier in the chapter, we would have the following calculations.

ITEM	CONTRACTOR RISK FACTOR	ASSIGNED VALUE	BASE (ITEM 18)	PROFIT OBJECTIVE
25.	Contract Type Risk	1%	4,952,500	49,525

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 5, Working Capital Adjustment

This section of the DD Form 1547 recognizes contractor working capital investment, the money required to finance contract expenses until contract payment is received.

The working capital recognition is used on fixed-priced contracts with Government financing. The base for calculation is contract cost financed by the Government. Calculate working capital costs as follows.

Step 1. Determine total contract cost EXCLUDING Facilities Capital Cost of Money (Item 20), reduced as appropriate when:

- The contractor has little cash investment (e.g. subcontractor progress payments liquidate late in period of performance).
- Some costs are covered by special financing provisions such as advance payments.
- The contract is multiyear and there are special funding arrangements.

Step 2. Calculate the portion of contract cost financed by the contractor. Normally that is 100% minus the customary progress payment rate. On contracts that provide flexible progress payments or progress payments to small business, use the customary rate for large businesses.

Step 3. Multiply the results of Step 2 by contract length factor. As used here, the term “contract length” refers to the period of time that the contractor has a working capital investment in the contract. Your estimate should be based on the time necessary for the contractor to complete the substantive portion of the work and should NOT include periods of performance contained in option provisions. Select the contact length factor from the following table.

12.3.2 Weighted Guidelines Calculations

(continued)

PERIOD OF SUBSTANTIVE PERFORMANCE	LENGTH FACTOR
21 months or less	.40
22 to 27 months	.65
28 to 33 months	.90
34 to 39 months	1.15
40 to 45 months	1.40
46 to 51 months	1.65
52 to 57 months	1.90
58 to 63 months	2.15
64 to 69 months	2.40
70 to 75 months	2.65
76 months or more	2.90

Step 4. Multiply the results of Step 3 by the interest rate determined by the Secretary of the Treasury to determine the working capital adjustment.

Section 5,
Working
Capital
Adjustment
(continued)

Example. Using the above approach with progress payments of 80 percent, a contract length of 25 months, and an interest rate of 9 percent, the calculation would be:

Step 1. Line 20 is \$5,398,225

Step 2. $100\% - 80\% = 20\%$
 $20\% \text{ of } \$5,398,225 = \$1,079,645$

Step 3. $\$1,079,645 * .65 = \$701,769$

Step 4. $\$701,769 * .09 = \$63,159$

Item 26 of the form would appear as follows:

26	WORKING CAPITAL	COSTS FINANCED	LENGTH FACTOR	INTEREST RATE	PROFIT OBJECTIVE
		\$1,079,645	.65	9%	\$63,159

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 6.
Facilities
Capital
Employed

DFARS 215.971-4

This section recognizes contractor investment in buildings and equipment.

Step 1 Determine the Facilities Capital Employed. As you learned in Chapter 10, total Facilities Capital Employed is calculated by dividing the Facilities Capital Cost of Money allowed on the contract by the cost of money rate using the DD Form 1861, Contract Facilities Capital Cost of Money. The total Facilities Capital Employed is then distributed into three components: land, buildings, and equipment, Block 7 of the DD Form 1861. The dollar figures from the DD Form 1861, Block 7, are then transferred to Items 27, 28, and 29 of the DD Form 1547.

Step 2 Assign the Appropriate Profit Weight. After transferring the costs, assign a profit/fee value to each category of investment. The following table shows the designated ranges and normal values for each:

FACILITIES CAPITAL EMPLOYED WEIGHT VALUES			
APPLICATION	ASSET TYPE	DESIGNATED RANGE	NORMAL VALUE
Standard (used for most contracts)	Land	N/A	0%
	Buildings	10% to 20%	5%
	Equipment	20% to 50%	35%
Alternate for highly facilitized companies performing R&D service contracts	Land	N/A	0%
	Buildings	0% to 10%	5%
	Equipment	15% to 25%	20%
Alternate for companies with low facilities investment performing R&D service contracts. Do NOT allow facilities cost of capital money.	Land	N/A	0%
	Buildings	0%	0%
	Equipment	0%	0%

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 6.
Facilities
Capital
Employed
(continued)

In assigning a profit/fee weight to facilities capital employed:

- Relate the usefulness of the facilities capital to the goods or services being acquired under the prospective contract.
- Analyze the productivity improvements and other anticipated industrial base enhancing benefits resulting from the facilities capital investment, including:
 - The economic value of the facilities capital, such as physical age, undepreciated value, idleness, and expected contribution to future defense needs
 - The contractor's level of investment in defense related facilities as compared with the portion of the contractor's total business which is derived from DoD.
- Consider any contractual provisions that reduce the contractor's risk of investment recovery, such as a termination protection clause, capital investment indemnification, and productivity saving rewards
- Ensure that increases in facilities capital investments are not merely asset revaluations attributable to mergers, stock transfers, take-overs, sales of corporate entities, or similar actions

In the range appropriate to your situation, you should assign the normal value unless you can justify a higher or lower value. Consider the following table:

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

TECHNICAL WEIGHT	
Consider ...	When ...
Significantly Above Normal Weight	<ul style="list-style-type: none"> There are direct and measurable benefits in efficiency and significantly reduced acquisition costs on the effort being priced. Maximum values apply only to those cases where the benefits of the facilities capital investment are substantially above normal
Above Normal Weight	<ul style="list-style-type: none"> There are direct identifiable, and exceptional benefits, such as: <ul style="list-style-type: none"> New investments in state-of-the-art technology which reduce acquisition cost or yield other tangible benefits such as improved product quality or accelerated deliveries Investments in new equipment for research and development applications Contractor demonstration that the investments are over and above the normal capital investments necessary to support anticipated requirements of DoD programs
Below Normal Weight	<ul style="list-style-type: none"> The capital investment has little benefit to DoD, for example: <ul style="list-style-type: none"> Allocations of capital apply predominately to commercial product lines Investments are for such things as furniture and fixtures, home or group level administrative offices, corporate aircraft and hangars, or gymnasiums Facilities are old or extensively idle
Significantly Below Normal Weight	<ul style="list-style-type: none"> A significant portion of defense manufacturing is done in an environment characterized by outdated, inefficient, and labor- intensive capital equipment

Section 6.
Facilities
Capital
Employed
(continued)

Step 3 Calculate the Facilities Capital Profit/Fee Objective. Using the above approach and normal assigned value, Section 6 could look like this

ITEM	CONTRACTOR FACILITIES CAPITAL EMPLOYED	ASSIGNED VALUE	AMOUNT EMPLOYED	PROFIT OBJECTIVE
27	Land		\$64,110	
28	Buildings	15%	\$160,275	\$24,041
29	Equipment	35%	\$416,715	\$145,850

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Section 7,
Total Profit
Objective

The total profit objective is the sum of all profit objectives calculated in Sections 2 - 6.

Line	24.	Performance Risk (Composite)	\$203,052
	25.	Contract Type Risk	49,525
	26.	Working Capital	63,159
	28.	Buildings	24,041
	29.	Equipment	<u>145,850</u>
	30.	Total Profit Objective	\$485,627

Section 8,
Negotiation
Summary

DFARS 215.975

This section summarizes the proposed, objective, and negotiated cost and profit positions. The section is primarily used for reporting to higher headquarters. Questions often arise regarding line 35, markup rates. The markup rate calculation includes both profit/fee and facilities capital cost of money as markup. As a result, offhand evaluations of the size of the markup can be misleading.

Section 9,
Contracting
Officer
Approval

After completion of the negotiation, the form must be signed by the contracting officer.

The following page shows a completed DD Form 1547 using the same values illustrated above.

(continued on next page)

12.3.2 Weighted Guidelines Calculations

(continued)

Completed
DD Form
1547

RECORD OF WEIGHTED GUIDELINES APPLICATION						REPORT CONTROL SYMBOL DD - P&L(Q)1751	
1 REPORT NO	2 BASIC PROCUREMENT INSTRUMENT IDENTIFICATION NO				3 SPIIN	4 DATE OF ACTION	
	a PURCHASING OFFICE	b FY	c TYPE PROC INST CODE	d PRISN		a YEAR 90	b MONTH May
5 CONTRACTING OFFICE CODE				ITEM	COST CATEGORY		OBJECTIVE
6 NAME OF CONTRACTOR ABCO				13	MATERIAL		190,000
				14	SUBCONTRACTS		939,000
7 DUNS NUMBER		8 FEDERAL SUPPLY CODE		15	DIRECT LABOR		1,540,000
				16	INDIRECT EXPENSES		2,183,500
9 DOD CLAIMANT PROGRAM		10 CONTRACT TYPE CODE		17	OTHER DIRECT CHARGES		100,000
				18	SUBTOTAL COSTS (13 thru 17)		4,952,500
11 TYPE EFFORT FFF		12 USE CODE		19	GENERAL AND ADMINISTRATIVE		445,725
				20	TOTAL COSTS (18 + 19)		5,398,225
WEIGHTED GUIDELINES PROFIT FACTORS							
ITEM	CONTRACTOR RISK FACTORS		ASSIGNED WEIGHTING	ASSIGNED VALUE		BASE (ITEM 18)	PROFIT OBJECTIVE
21	TECHNICAL		40 %	4.5			
22	MANAGEMENT		20 %	4.0			
23	COST CONTROL		40 %	3.8			
24	PERFORMANCE RISK (COMPOSITE)			4.1		4,952,500	203,503
25	CONTRACT TYPE RISK			1%		4,952,500	49,525
26	WORKING CAPITAL		COSTS FINANCED 1,079,645	LENGTH FACTOR .65		INTEREST RATE 9 %	63,159
	CONTRACTOR FACILITIES CAPITAL EMPLOYED			ASSIGNED VALUE		AMOUNT EMPLOYED	
27	LAND					64,110	
28	BUILDINGS			15%		160,275	24,041
29	EQUIPMENT			35%		416,715	145,850
30	TOTAL PROFIT OBJECTIVE						485,627
NEGOTIATION SUMMARY							
				PROPOSED		OBJECTIVE	NEGOTIATED
31	TOTAL COSTS			6,732,000		5,398,225	
32	FACILITIES CAPITAL COST OF MONEY (DD Form 1861)			47,158		57,699	
33	PROFIT			1,009,800		485,627	
34	TOTAL PRICE (Line 31 + 32 + 33)			7,788,958		5,942,542	
35	MARK-UP RATE (Line 32 + 33 divided by 31)			15.7 %		10.08 %	%
CONTRACTING OFFICER APPROVAL							
36 TYPED / PRINTED NAME OF CONTRACTING OFFICER (Last, First, Middle Initial)			37 SIGNATURE OF CONTRACTING OFFICER			38 TELEPHONE NO	39 DATE SUBMITTED (YYMMDD)
OPTIONAL USE							
96	97		98		99		

DD Form 1547, AUG 87 Previous editions are obsolete

12.3.3 Exemptions from Weighted Guidelines

Introduction

You **MUST** perform a profit analysis to develop a price estimate using cost analysis. *A **profit analysis shall NOT be performed where the award is made on the basis of adequate price competition.***

Exempted Contracts

In lieu of the Weighted Guidelines Method, DoD contracting officers:

- **MAY** use an “alternative” structured approach for the following:
 - Contract actions under \$500,000
 - Architect-engineering or construction contracts
 - Contracts primarily requiring deliver of material supplied by subcontractors
 - Termination settlements
 - Contracts for which the Weighted Guidelines would NOT produce a reasonable overall profit/fee and the head of the contracting activity approves use of an alternate approach in writing
- **SHALL USE** modified weighted guidelines with nonprofit organizations (Use the weighted guidelines method as modified by DFARS 215.972)
- **SHALL NOT USE** weighted guidelines or an alternate approach for cost-plus-award fee contracts

DFARS
215.903(b)

DFARS
215.972

DFARS
215.974

DFARS
215.973

Using an Alternate Structured Approach. When the contracting officer elects to use an alternate structured approach, that approach **MUST** specifically address: performance risk, contract type risk (including contractor working capital), and contractor facilities capital. In addition, the contracting officer **MUST** comply with the requirements of DFARS 215.973.

Facilities Capital Cost of Money Consideration. When using an alternate structured approach, a discrete reduction for facilities cost of money needs to be taken. Therefore, the overall prenegotiation profit objective must be reduced by 1% of total cost or the amount of facilities capital cost of money, whichever is less.

Nonprofit Organizations

When evaluating profit/fee for contracts with nonprofit organizations, including educational institutions, a modified weighted guidelines approach is used. The modified weighted guidelines approach for nonprofit organizations is the same as for profit organizations but with the reductions identified in DFARS 215.972.

DFARS
215.972

End-of-Chapter Vignette

As the office's leading authority on profit, you can surely help Andrew out on this one!

Use the NASA Form 634, Structured Approach Profit/Fee Objective, to develop a profit position (see next page). In addition to completing the NASA Form 634, develop a brief written rationale for your assigned weights. You may find Appendix 1 to the audit report helpful in completing "other factors."

COST CATEGORY	RATIONALE FOR ASSIGNED WEIGHT
Material Acquisition	
Direct Labor	
Overhead	
Other Costs	
General Management	
Cost Risk	
Investment	
Performance	
Socio-Economic Programs	
Special Situations	

End-of-Chapter Vignette

NASA		Structured Approach		
Profit/Fee Objective				
Contractor		RFP/Contract No.		
Business Unit		Contract Type		
Address		<i>Firm Fixed Price</i>		
Contractor Effort				
1. Cost Category	Government's Cost Objective (a)	Weight Range (b)	Assigned Weight (c)	Weighted Profit/Fee ((a) X (c)) (d)
Material Acquisition				
<i>Purchased Parts</i>		1% TO 4%		
<i>Commercial Items</i>				
Direct Labor				
<i>Manufacturing</i>		4% TO 12%		
<i>Engineering</i>				
Overhead				
<i>Manufacturing</i>		3% TO 8%		
<i>Engineering</i>				
<i>Materials</i>				
Other Costs		1% TO 3%		
General Management (G&A)		4% TO 8%		
1A. Total				
OTHER FACTORS				
FACTOR	Measurement Base (a)	Weight Range (b)	Assigned Weight (c)	Weighted Profit/Fee 1.A((a) X (c)) (d)
Cost Risk	Total Cost Objective 1.A (a)	0% TO 7%		
Investment		-2% TO +2%		
Performance		-1% TO +1%		
Socio-Economic Programs		-.5% TO +.5%		
Special Situations				
2A. Total Other Factors				
3. Subtotal Profit/Fee Lines (1.A) + (2.A)				
4. Less Facilities Cost Of Capital				-
5. Total Profit/Fee Objective Line (3) - (4)				

Chapter Vignette

Preparing a Negotiation Position

“If you have been documenting the results of your work so far, then you are well on your way to preparing your negotiation position,” Kay advises Andrew. “Now, go back to your desk and summarize your position. I want you to document how you got to your position and specifically address differences between your numbers, and the proposed numbers cost element by cost element. It is important that you do a thorough job of documentation. It will become part of the official contract file and will be used to evaluate the reasonableness of the Government position and for post award reviews.”

Andrew is anxious and excited. Finally, he is getting close to negotiating a contract, but, at the same time, he is concerned about how good a job he has done. Pulling his work together and taking a negotiation position is getting down to what his job is all about!

Course Learning Objectives

At the end of this chapter, you will be able to:

1. Develop a position on the total contract price and verify that price through price analysis
2. Establish prenegotiation objectives on overall price for the type of contract being negotiated
3. Identify potential trade-offs between the cost proposal, other proposed business terms and conditions, and the technical proposal
4. Document the cost analysis

Chapter Overview

Overview	<p>Having analyzed the individual elements of cost and profit/fee, you now need to prepare for negotiations. The prenegotiation position brings together all the data collected during the evaluation and uses the data to develop positions for negotiation.</p> <p>In this chapter, you will learn about:</p> <ul style="list-style-type: none">• the use of price analysis to determine if overall price is reasonable• the impact of contract type on negotiation objectives• trade-off analysis• basic documentation requirements
Maps in This Chapter	<p>This chapter includes the following maps:</p> <p>13.1 TRADE-OFF ANALYSIS 13-5</p> <p>13.1.1 Perform Overall Price Analysis 13-6</p> <p>13.1.2 Involve Negotiation Team in Trade-Off Analysis..... 13-7</p> <p>13.1.3 Cost Drivers and Tradeoffs..... 13-8</p> <p>13.1.4 Cost Risk13-10</p> <p>13.2 CONTRACT TYPE AND PRENEGOTIATION OBJECTIVES.....13-13</p> <p>13.3 DOCUMENTATION.....13-20</p> <p>13.3.1 Rationale and Factual Support13-21</p> <p>13.3.2 Price Prenegotiation Memorandum Checklist13-25</p>

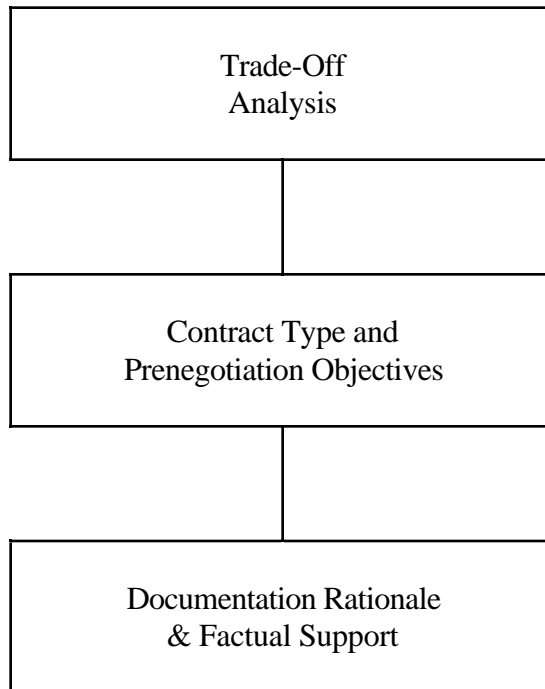
(continued on next page)

Chapter Overview

(continued)

Overview
Flowchart

This flowchart shows the relationship of the sections in this chapter.



13.1 TRADE-OFF ANALYSIS

Section Overview

Overview

In this section, you will cover:

- reasons for involving the entire negotiation team in the trade-off analysis
 - identifying the “cost drivers” in the contract
 - performing cost-value trade-off analysis to determine the optimum contract arrangements
 - identifying the cost risks in the proposal
 - identifying means of reducing or controlling contractor cost risk
-

Maps in This Section

This section includes the following maps:

- Perform Overall Price Analysis
 - Involve Negotiation Team in Trade-Off Analysis
 - Cost Drivers and Cost/Value Tradeoffs
 - Cost Risk
-

13.1.1 Perform Overall Price Analysis

Determine if
Overall Price is
Reasonable

As you know from prior chapters, looking only at the reasonableness of individual costs is not enough. You must, also, look at the reasonableness of the total procurement. In chapter one, you saw the example of asking your local mechanic to build you a Chevrolet Caprice from purchased spare parts. Even if the local mechanic charged you a fair price for all parts and labor with only a nominal profit, the car would be at least ten times more expensive than the same car off the assembly line. The price would not be reasonable!

In performing an overall price reasonableness analysis, you should compare the proposed price with one or more of the following bases:

POSSIBLE PRICE BASES	
1	Proposed prices received in response to the solicitation
2	Commercial prices
3	Historical proposed and contract prices
4	Rough yardsticks or cost estimating relationships (CERs)
5	Independent Government cost estimates

If your price analysis does not support the findings of your cost analysis, you must reexamine your cost analysis result. Alternative methods of contract completion should be considered along with a close examination of specification and statement of work requirements.

If the results of cost analysis and price analysis CANNOT be reconciled by the close of negotiations, your price negotiation memorandum must document the reasons that caused you to accept an unreasonable price.

Or you may look to negotiate trade-offs to bring the cost within the reasonable range.

13.1.2 Involve Negotiation Team in Trade-Off Analysis

Introduction

Trade-offs can take many forms. The three key areas that affect contract price are cost, schedule, and performance. Often, negotiators totally focus on only one area. To negotiate the best deal possible, you also need to consider all three areas, taken as a whole. Trade-off analysis involves a team approach using all the disciplines represented in the analysis. The contracting officer, the price analyst, the technical personnel, and auditors all have important roles.

Team Effort

A well developed negotiation position integrates the inputs of all negotiation team members. For example, on a multi-year proposal, you will need a schedule analysis from your technical personnel to validate the reasonableness of time periods where work is expected to occur. Once you have identified when you expected work to be performed, you might need:

- Labor rate input from the auditors.
- Time series analysis and improvement curve analysis from technical and pricing personnel.
- Inputs from the requiring activity to determine the feasibility of possible alternatives in delivery timing, performance, production methods, and materials.

It is highly unlikely that any one person would possess the expertise in all these areas; hence, a team approach is the only logical option. Ultimately, the contracting officer is responsible for the reasonableness and legitimacy of the negotiation; therefore, the team's focus is to support the contracting officer.

Cautions About Tradeoffs

FAR 15.606 & 15.610

Before bringing a potential trade-off (or any other change in terms and conditions) to the negotiation table, you must consider:

- All costs to the Government entailed by the tradeoffs.
- All provisions of the FAR regarding the related terms and conditions.
- The nature of the discussions. In a sole source environment, you may directly negotiate changes in terms and conditions. In competitive procurements, you may have to amend the RFP and notify other offerors as provided in FAR 15.606. You must avoid technical transgression or leveling, as described in FAR 15.610.

13.1.3 Cost Drivers and Tradeoffs

Introduction	Cost is the key factor in price reasonableness. In preparing for negotiation, two major concerns are identifying key cost drivers and cost-value trade-offs.
--------------	--

Identify Drivers	Cost drivers are those aspects of the proposal that if changed would have a major impact on proposed cost. Cost drivers can take many forms. Some of the common cost drivers are terms and conditions, delivery, and technical specifications. For example, if the contract does not allow for use of existing Government property, then offered prices may include costs for the acquisition or fabrication of additional tooling or test equipment. If delivery is needed on an expedited basis, then premium charges may be incurred. If the technical specification called for an expensive process when another less expensive process would meet the needs of end users, then offered prices would be fair but unreasonably high through no fault of the offerors.
------------------	--

Perform Cost-Value Trade-Off Analysis	Having identified the factors that drive contract cost estimates, you can begin reviewing the impact of alternatives. Again, schedule is a good example of trade-off analysis. The following scenarios are examples of how schedule can be a cost driver:
---------------------------------------	---

Example 1. Normal delivery time for Part A is six months after receipt of an order at a unit price of \$1,000. The requiring activity wants the part in three months at the same price. The vendor can get the part in three months, but only at a premium price of \$1,250. In this case, schedule is a cost driver with a shorter delivery schedule resulting in a cost increase.

Example 2. The requiring agency has asked for delivery of Part B twelve months from today. The vendor has quoted a unit price of \$5,000 for the twelve month delivery. At the same time, the vendor has offered to add this requirement for Part B to a projected production run. By combining the requirements, a second set-up charge can be avoided and the part can be purchased for \$4,500, BUT delivery cannot be made in less than 15 months. If the requiring activity cannot accept the 15 month delivery, schedule will be a significant cost driver.

(continued on next page)

13.1.3 Cost Drivers and Tradeoffs

(continued)

Perform Cost-
Value Trade-
Off Analysis

(continued)

Example 3. The proposal calls for a delivery 36 months after receipt of an order. During the technical analysis, it was found that the offeror's shop loading schedule would allow for delivery in 24 months. The proposed part has been in continuous production for several years and is “well down the improvement curve.” The earlier delivery year has significantly lower projected labor rates, and the additional volume would significantly reduce overhead rates. As a result, earlier delivery would actually reduce contract cost.

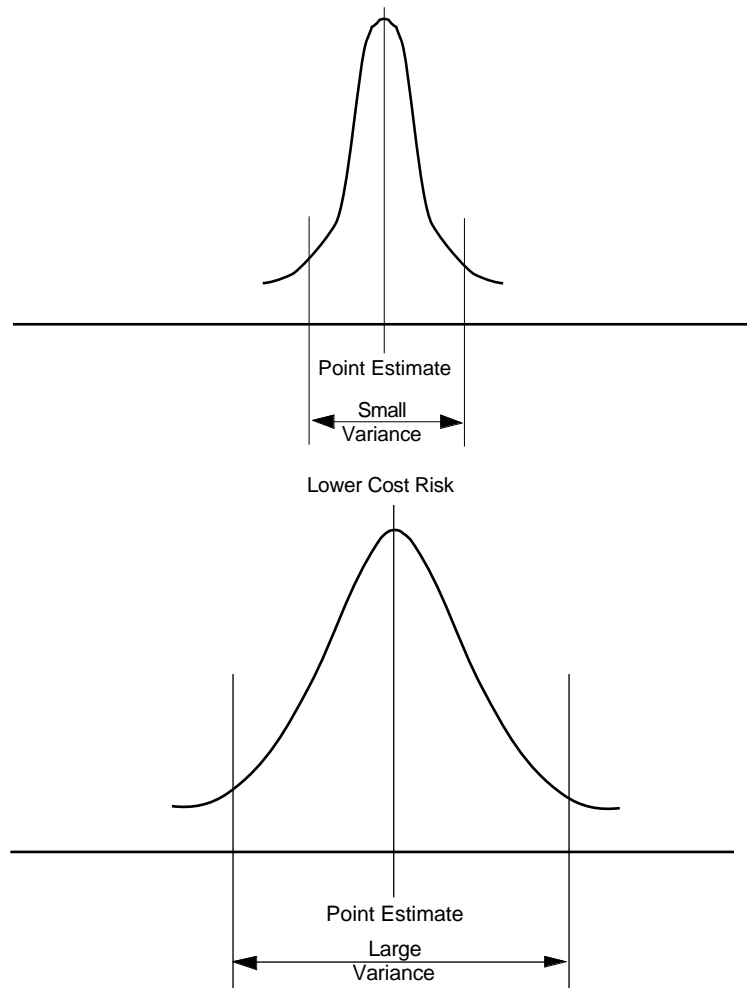
13.1.4 Cost Risk

Introduction

The subject of cost risk is a recurring theme. Throughout the process of developing a proposal, evaluating the proposal, and negotiating the contract, cost risk is a subject of major concern to both the offeror and the Government. The two challenges in cost risk evaluation are identifying sources of cost risk and identifying means of reducing or controlling contractor cost risk.

Identify Sources of Cost Risk.

Cost estimates, whether they are the offeror's proposed or the Government's recommended, are "point estimates". In all cases of projected effort, the point estimate is an estimate of what the estimator believes is most likely to happen. Since things rarely happen exactly as predicted, there are usually variances between projected and actual. Known to statisticians as an error probability distribution, the greater the potential variability between the projected and actual cost, the greater the cost risk.



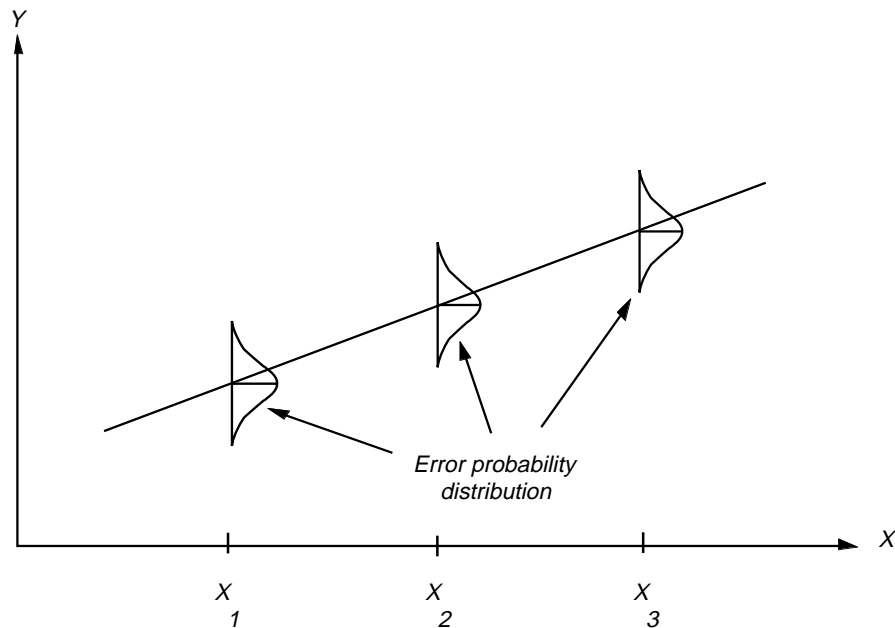
(continued on next page)

13.1.4 Cost Risk

(continued)

Identify
Sources of
Cost Risk
(continued)

Even in the case of a line-of-best-fit (see chapter 5), you are dealing with a point estimate—a point on the best-fit line with a probability distribution surrounding it.



Two principle sources of cost risk are costs that are difficult to predict due to lack of experience in producing the product, and market volatility on material prices. In both these cases, a point estimate can be made, but the potential variability from the point estimate can lead to excessive cost risk.

Identify Means
of Reducing or
Controlling
Contractor
Cost Risk

There are three major ways of dealing with cost risk: contract type, use of Government property, and contract terms and conditions.

Consider Contract Type. As covered earlier in this text, the basic driver behind contract type selection should be cost risk. Where the cost risk is very high, a cost reimbursable contract may be appropriate. Where the product is well known and cost risk is low, a fixed-price contract may be most appropriate. Variations on the basic contract types, such as the use of fixed-price economic price adjustment contracts where key material costs are highly volatile, are useful in specific situations.

(continued on next page)

13.1.4 Cost Risk

(continued)

Identify Means
of Reducing or
Controlling
Contractor
Cost Risk
(continued)

Consider Use of Government Property. Government furnished property and use of Government owned facilities can greatly reduce cost risk. The manufacture of rocket fuels and explosives is a good example of how cost risk can be reduced through use of Government Furnished Property. Due to the dangers inherent in the production of these products, it would be a prohibitively risky investment for a contractor to build such production facilities. Also, it is virtually impossible to get insurance on these facilities. If the Government provides the facilities and assumes the risk, these products can be procured at a significantly lower total cost.

Consider Contract Terms and Conditions. Contract terms and conditions can provide an avenue for tailoring requirements to specific contract cost risk concerns. Consider the needs of the Government, commercial practice, the capabilities of the offerors, and elements of risk identified in the offeror(s) proposal. It may be possible to reduce contractor risk and contract cost while still meeting the needs of the Government. The following are some examples of contract terms that have been used to reduce cost risk:

Example 1. On the F-16 fighter program, where a specified percentage of the total product must be subcontracted to European participating countries, a contract clause has been included allowing for price adjustments to cover increased costs associated with European producers over domestic sources.

Example 2. The use of flexible progress payments in lieu of customary progress payments reduces contractor cost risk on long-term contracts with significant operating capital investments.

Example 3. The use of contract clauses allowing variations in delivery schedules can reduce cost risk by allowing for optimal production and shipping schedules.

Example 4. The use of clauses that obligate the Government to provide existing Government data eliminates the cost and associated risk for contractors to acquire the information themselves.

Example 5. The use of contract clauses allowing variations in quantities on large volume commodity items can reduce cost risk by allowing for standard lot shipments and the elimination of excessive administrative work on insignificant “ship-short” situations.

213.2 CONTRACT TYPE AND PRENEGOTIATION OBJECTIVES

Section Overview

Overview Contract type is the key factor in determining the price related contract elements that you must negotiate. Depending on the contract type, you may be able to restrict negotiations to total price or you may be required to negotiate agreements on cost, profit, and other price related elements.

CONTRACT TYPE	PRICE ELEMENTS REQUIRING NEGOTIATION	PAGE
Firm Fixed-Price & Firm-Fixed-Price, Level-of-Effort Term	Total Price	13-16
Fixed-Price Economic Price Adjustment	Fixed-Price Basis for Determining Economic Adjustment Limits on Economic Adjustments	13-16
Fixed-Price Incentive Firm	Target Cost Target Profit Cost-Sharing Arrangement Ceiling Price	13-16
Fixed-Price Incentive Successive Targets	Initial Target Cost Initial Target Profit Initial Cost-Sharing Arrangement Ceiling for Firm Target Profit Floor for Firm Target Profit Production Point(s) Where Firm Target Cost and Firm Target Profit Are Negotiated Ceiling Price	13-17
Fixed-Price with Prospective Price Redetermination	Firm Fixed-Price for Initial Period Stated Times for Prospective Price Redetermination	13-17
Fixed-Ceiling-Price Contracts with Retroactive Price Redetermination	Fixed Ceiling Price Agreement to Price Redetermination After Contract Completion	13-17

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

CONTRACT TYPE	PRICE ELEMENTS REQUIRING NEGOTIATION	PAGE
Fixed-Price-Award-Fee	Fixed Price Award Fee	13-20
Cost-Plus-Incentive-Fee	Target Cost Target Fee Cost-Sharing Arrangement Minimum Fee Maximum Fee	13-18
Cost-Plus-Award-Fee	Estimated Cost Base Fee Award Fee	13-19
Cost-Plus-Fixed-Fee	Estimated Cost Fixed Fee	13-19
Time-and-Materials	Labor-Hour Price Material Handling Cost Ceiling Price	13-20
Labor-Hour	Labor-Hour Price Ceiling Price	13-20

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

Firm Fixed-Price (FFP)

Both the firm fixed-price contract and the firm-fixed-price level-of-effort contracts have a single “bottom-line” price without differentiation between cost and profit. While your cost analysis and support will have both cost and profit identified, you will only be negotiating TOTAL PRICE.

Fixed-Price with Economic Price Adjustment (FPEPA)

While the contract has a fixed-price, the FPEPA contract allows for some upward or downward price adjustment based on specific conditions spelled out in the contract. Such contracts must stipulate the specific cost elements subject to adjustment, the method for measuring adjustments, the timing of adjustments, and any limits on maximum or minimum adjustments. Negotiable issues include the fixed-price, the method for doing adjustments, and limits on adjustments.

Fixed-Price Incentive Firm Target (FPIF)

There are four components necessary for the FPIF contract.

COMPONENTS	EXPLANATIONS
Ceiling Price	maximum price the Government will pay
Target Cost	negotiated values based on the parties'
Target Profit	best estimate of what the final cost will be
Cost Sharing Arrangements	define the sharing of the difference (underrun or overrun) from the target cost

Typically, each party's share is negotiated as a percentage and expressed as a ratio. The two shares must sum to 100 percent. A share ratio places the Government share first. For example, a 70/30 ratio would mean that the Government's share is 70 percent and the contractor's share is 30 percent. The FPIF contract should be used when risk is too great for an FFP contract but contractor assumption of a degree of cost risk will have a positive effect on contract performance. The negotiable issues include: the target cost and target profit, the sharing arrangements, and, while the ceiling price may be driven by funding limitations, the ceiling price is also negotiable.

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

Fixed-Price
Incentive
Successive
Targets (FPIS)

The FPIS contract is similar to the FPIF contract but provides for adjustment of targets within the ceiling price. The elements include:

- initial target cost
- initial target profit
- initial profit adjustment formula to be used for establishing the firm target profit, including a ceiling and floor for the firm target profit
- the production point for negotiation of firm target cost and profit
- a ceiling price.

The FPIS contract should be used when there is insufficient information to establish realistic targets before award but there is assurance that reliable information will be available early in contract performance. At that time, the Government will negotiate an FPIF or FFP contract.

Fixed-Price
Prospective
Price
Redetermination
(FPRP)

FPRP contract elements include:

- firm fixed-price for the initial contract period
- an established time or times during performance for negotiation of price for subsequent periods

An FPRP type contract shall not be negotiated unless negotiations have established that the conditions for negotiation of an FFP contract are not present and an FPI contract would not be more appropriate.

Fixed-Price
Retroactive Price
Redetermination
(FPRR)

The FPRR type contract is a fixed-ceiling contract with retroactive price redetermination. Pricing elements include:

- a fixed ceiling price
- provision for price redetermination within the ceiling after contract completion.

The FPRR contract can only be used for research and development of less than \$100,000 when a fair and reasonable FFP contract cannot be negotiated. Use of the FPRR type contract requires approval by the head of the contracting activity.

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

Fixed-Price Award Fee (FPAF)

A fixed price award fee contract consists of two parts, a base price that is fixed at the time of negotiation and an award fee (e.g., a percentage of the fixed price) that the contractor can earn by exemplary performance. The amount of award fee earned by the contractor is based on the unilateral judgement of the Government and cannot be disputed by the contractor.

The negotiable issues include:

- base price
- the total amount available for award fee
- award fee criteria and evaluation periods

The number of evaluation criteria and related requirements will differ widely among contracts, but they should motivate the contractor to improve performance. The evaluation periods can be monthly, quarterly, annual, or at contract completion—whichever is appropriate for the contract. The FPAF contract should be used in situations where it is not feasible nor effective to devise predetermined incentive targets and the likelihood of meeting contract objectives will be enhanced by the CPAF arrangement.

Cost-Plus- Incentive-Fee (CPIF)

Similar to the FPIF contract, the CPIF contract requires negotiation of:

- target cost
- target fee
- cost-sharing arrangements.

The CPIF contract does NOT have the ceiling price of an FPIF contract. Instead you MUST negotiate:

- the minimum and maximum fees
- the limitation of funds.

FAR 15.903(d)

Until the contractor reaches the minimum or maximum fee, the overruns or underruns will be shared in accordance with the sharing arrangements. When either the minimum or maximum fee is reached, the fee is fixed at that level regardless of costs. Total price is limited by the total funds that the Government has obligated to the contract. The CPIF contract should be used for development and test programs where a cost-reimbursement contract is necessary and the incentive arrangement is likely to motivate contractor management of the contract.

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

Cost-Plus-Award-Fee

An award fee consists of two parts, a base fee that is fixed at the time of negotiation and an award fee that the contractor can earn by exemplary performance. The amount of award fee earned by the contractor is based on the unilateral judgement of the Government and cannot be disputed by the contractor.

The negotiable issues include:

- estimated cost
- base fee
- the total amount available for award fee
- award fee criteria and evaluation periods

FAR 15.903(d)

The number of evaluation criteria and requirements they represent will differ widely among contracts, but they should motivate the contractor to improve performance. The evaluation periods can be monthly, quarterly, annual, or at contract completion—whichever is appropriate for the contract. The CPAF contract should be used in situations where it is not feasible nor effective to devise predetermined incentive targets and the likelihood of meeting contract objectives will be enhanced by the CPAF arrangement. Total price is limited by the total funds that the Government has obligated to the contract. The limitations on maximum fee in FAR 15.903(d) apply.

Cost-Plus-Fixed-Fee

FAR 15.903(d)

In this contract type, you are concerned with an estimated cost that is used as a basis for negotiating a fixed fee. Unlike incentive contracts, the fee does not vary with actual cost. The CPFF contract should be used when risks are great and difficult to quantify. Contractors will have little incentive to control contract costs. As with the other reimbursable contracts, total price is limited by the total funds that the Government has obligated to the contract. The limitations on maximum fee in FAR 15.903(d) apply.

(continued on next page)

13.2 Contract Type and Prenegotiation Objectives

(continued)

Time and Materials

This contract type provides for acquiring supplies or services on the basis of (1) direct labor hours at fixed hourly rates that include wages, overhead, general and administrative expenses, and PROFIT, and (2) materials AT COST, including, if appropriate, material handling costs as part of material costs. The only exception to materials at cost is where the contractor regularly sells the materials to the general public in the normal course of business. The use of this optional material pricing method can be used only if the following four criteria are met:

1. The total estimated contract price does not exceed \$25,000, **OR** the estimated price of material so charged does not exceed 20% of the estimated contract price.
2. The material to be so charged is identified in the contract.
3. No element of profit on material so charged is included as profit in the fixed hourly labor rates.
4. The contract provides **(a)** that the price to be paid is based on established catalog or list price in effect when materials are furnished, and **(b)** that the price does not exceed the price paid by the contractor's most favored customer for the same item in like quantity, or the current market price, whichever is lower.

A time and materials contract must include a ceiling price. If the contractor exceeds the ceiling price, the contractor does so at its own risk. The contracting officer must document the contract file to justify the reasons for and amount of any subsequent change in the ceiling price.

Labor-Hour

A labor-hour contract is a variation of the time-and-materials contract. The significant difference is that the contractor does not supply materials. The primary negotiable pricing issue is the hourly price for each category of labor covered by the contract. Like the time-and-materials contract, the labor-hour contract requires a ceiling price.

13.3 DOCUMENTATION

Section Overview

Overview This section covers the topics generally required to be documented in the prenegotiation memorandum:

- the procurement situation
- the contractor's estimating rationale
- the analysis and differences with contractor rationale
- the risks considered in developing the negotiation positions

At the end of this section, a prenegotiation memorandum checklist is provided for future use in preparing prenegotiation memorandums.

Maps in This Section This section includes the following maps:

- Rationale and Factual Support
- Price Prenegotiation Memorandum Checklist

13.3.1 Rationale and Factual Support

Introduction	<p>The rationale for a negotiation position is typically formalized in a pre-negotiation document. While format and specific requirements vary from one agency to the next, you generally should document:</p> <ul style="list-style-type: none"> • The procurement situation, • The contractor estimating rationale, • Government analysis and differences with the contractor's rationale, and • The Government's intended negotiation positions. <p>The Price Prenegotiation Memorandum Checklist (see page 13-25) identifies other issues to consider in preparing for price negotiations. Even if your organization does not require a prenegotiation memorandum, the checklist provides a guide to important points to consider.</p> <p>Pre-negotiation documentation provides a clear audit trail for documenting the negotiation and provides management reviewers with negotiation approval information.</p>
Documenting the Procurement Situation	<p>In describing the procurement situation, include any outside influences and time pressures. If there are no unusual circumstances, so state. Show the delivery schedule and period of performance. If there is a difference between the Government schedule and the proposed schedule, discuss how it was resolved. Identify any previous buys of the same or similar items. Identify whether Government facilities or property will be furnished to the contractor as a result of the negotiation. Indicate the location(s) where the contract will be performed. Describe any unique features of the negotiation, and the appropriateness of the contract type.</p>
Document Contractor Estimating Rationale	<p>In addition to a statement on the contractor's overall estimating system, this section will show the contractor's cost proposal identified by major cost elements. Typically, next to the contractor's proposed costs are Government recommended costs. Using this comparison and a cross reference column, you have the basic format for your document.</p>

(continued on next page)

13.3.1 Rationale and Factual Support

(continued)

Document
Contractor
Estimating
Rationale
(continued)

COST ELEMENT	PROPOSED	OBJECTIVE	DIFFERENCE	REFERENCE
Engineering Direct Labor	\$1,000,000	\$900,000	\$100,000	See Para a
Engineering Overhead	\$2,500,000	\$2,025,000	\$475,000	See Para b
Subtotal	\$3,500,000	\$2,925,000	\$575,000	
G&A	\$350,000	\$292,500	\$57,500	See Para c

Document
Analysis and
Differences
with
Contractor
Rationale

In the above partial cost breakdown, the proposed and objective positions are clearly identified. If you were to look at engineering, you would see that paragraph “a” describes the basis of the proposed cost as well as the rationale for the Government position. Paragraph “a” would, also, reference any audit or technical reports, and would discuss the disposition of any significant findings. Paragraphs “b” & “c” would discuss the same subjects found in paragraph “a” with one major exception. Since these are overhead and G&A rates, the paragraphs need to address whether the dollar differences are the result of differences in the application base or in the rates themselves. If you look closely, you will see that the engineering overhead dollar reductions are a result of both reduced engineer labor dollars and a reduced engineering overhead rate. As for G&A, the difference is only in the subtotal dollars used as the allocation base with no difference in the G&A rate.

ENGINEERING OVERHEAD	CALCULATIONS
Proposed	$\$1,000,000 * 250\% = \$2,500,000$
Recommended	$\$900,000 * 225\% = \$2,025,000$
GENERAL & ADMINISTRATIVE	
Proposed	$\$3,500,000 * 10\% = \$350,000$
Recommended	$\$2,925,000 * 10\% = \$292,500$

(continued on next page)

13.3.1 Rationale and Factual Support

(continued)

Consider Risk in Developing Negotiation Positions

As discussed earlier, we deal in point estimates with a range of reasonable variation both above and below the point value. The point estimate should be your objective, with minimum and maximum positions based on your assessment of reasonable variation. While individual agency guidance may vary, the classic approach to developing a negotiation position calls for identifying three positions; minimum, objective, and maximum.

Minimum. The minimum, sometimes called the “going in position”, is at the low end of the reasonable range. In effect, you are saying that a price lower than the minimum is unreasonably low. The position should be supported with a detailed rationale. If you use the minimum as your opening offer, you **MUST BE READY** to explain to the contractor how the position constitutes a reasonable offer.

There may be situations where the offeror has proposed a cost below what you believe is a reasonable minimum objective. In such situations, you should present to the offeror your reasons for believing that the proposed cost is unreasonably low. If the offeror fails to change or support the cost, you must consider that failure in your analysis of proposal cost realism. See Chapter 14 for more information on cost realism analysis.

Objective. The objective is point estimate. It should be your best estimate of what the effort should cost, and the position where you would ideally like to settle.

Maximum. The maximum is at the high end of the reasonable range. In effect, you are saying that a price higher than the maximum is unreasonably high. You would not go above your maximum without additional data that would validate a higher figure. If you required a negotiation clearance prior to entering negotiations, you will likely have to seek reapproval before negotiating a price higher than the maximum. In any event, if you exceed the maximum, be prepared to document a clear audit trail of how you concluded a higher price was both fair and reasonable.

(continued on next page)

13.3.1 Rationale and Factual Support

(continued)

Document the
References
Used in
Position
Development

Documentation of the reference documents used in developing your negotiation positions is essential. You need to be able to find key references during management review of contract negotiation objectives, during negotiations, and during preparation of the price negotiation memorandum.

If a question arises later concerning defective pricing, it is vital that you have a detailed record of the information that you relied on during negotiations. Remember, you must have relied on the defective data to prove that defective pricing data affected contract price.

PRICE PRENEGOTIATION MEMORANDUM CHECKLIST

Subject Line

- _____ 1. Identify company/division/cost center and location.
- _____ 2. Show contract or solicitation number.
- _____ 3. Identify item to be purchased.
- _____ 4. Identify fiscal year funds.

Memorandum Text

Introductory Summary

- _____ 1. Provide comparative figures summarizing pricing elements of the proposal, objective, and differences, by cost, profit/fee, and price.
 - _____ Profit/fee rate
 - _____ Incentive share
 - _____ Minimum/maximum fee
 - _____ Ceiling price and percentage of target cost
 - _____ Option prices
 - _____ Type contract

Particulars

- _____ 1. Identify dates, places, and participants in fact-finding.
- _____ 2. Identify quantities being negotiated.
- _____ 3. Show unit prices quoted and objective.

Procurement Situation

- _____ 1. Identify type of negotiation action (new contract, etc.).
- _____ 2. Describe contract items or services included in objective amount and identify status (development, production, etc.).
- _____ 3. Place of contract performance.
- _____ 4. Show delivery schedule or period of performance.
- _____ 5. State if there is any differences between the delivery schedule objective and the delivery schedule proposed.

(Procurement Situation continued on next page)

PRICE PRENEGOTIATION MEMORANDUM CHECKLIST (continued)

Procurement Situation (continued)

- _____ 6. State whether there have been any previous buys of similar products, and if so identify:
 - _____ When
 - _____ How many
 - _____ Schedule/production rate
 - _____ Contract type
 - _____ Unit prices or total prices including both target and final prices if applicable
- _____ 7. Identify if Government facilities will be furnished as a result of the contract, and, if so, the estimated dollar value.
- _____ 8. Describe any unique features of the procurement action; for example should-cost, design-to-cost, life-cycle cost, or special provisions affecting cost.
- _____ 9. Describe any outside influences or time pressures associated with the procurement; for example, procurement priority, funding limitations, etc.

Prenegotiation Summary

- _____ 1. Show proposed costs, prenegotiation objectives, and differences, tabulated in parallel form by major element of cost.
- _____ 2. Identify the major considerations in pricing each major cost element in a separate paragraph showing:
 - _____ Treatment accorded the element in the proposal including derivation of the estimate and “as of” data used as a basis for projection.
 - _____ Availability, adequacy, and use of subcontractor cost or pricing data.
 - _____ Extent and adequacy of offeror review of subcontract proposals.
 - _____ Describe how the Government objective for each major cost element was developed.
 - _____ Consideration given to information contained in in-house technical evaluations, field analyses, or audit reports.
 - _____ Description of any additional or updated information obtained during fact-finding and the consideration given to it.
 - _____ Identification of any offeror provided data that formed the basis of the objective.
 - _____ Identification of any data or information relied on instead of contractor provided data
 - _____ Impact of the procurement on company volume and its impact, if any, on each major cost element.
 - _____ If economic adjustment, specified contingencies, savings clauses, or other provisions are included, describe the details and rationale for use.
- _____ 3. Describe, in a separate paragraph, how the Government profit objective was developed.
 - _____ If structured approach used, rationale supporting assigned weights.
 - _____ If structured approach not used, details on alternate approach and any weights used.

(Checklist continued on next page)

PRICE PRENEGOTIATION MEMORANDUM CHECKLIST (continued)

Prenegotiation Summary (continued)

- _____ 4. Justify the contract type selected including, as applicable:
- _____ Share line
 - _____ Ceiling price

Miscellaneous

- _____ 1. Identify audit reports received.
- _____ 2. Identify contractor reviews received:
- _____ Purchasing system
 - _____ Accounting system
 - _____ Estimating system
 - _____ Property system
 - _____ Compensation system
- _____ 3. Identify field technical reports received.
- _____ 4. Identify in-house technical evaluations received.
-

End-of-Chapter Vignette

Help Andrew bring it all together! This should be easy since you have summarized much of the needed information in earlier chapters.

Complete the following selected items from the major sections of the Price Prenegotiation Memorandum:

Introductory Summary

Profit Rate: Proposed_____ Objective_____
Remarks:

Contract Type:

Particulars

Quantity being negotiated:

Unit Price: Proposed_____ Objective_____

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

Procurement Situation

Describe contract items to be procured:

Place of performance:

Delivery schedule/period of performance:

History of previous buys:

Unique features of the procurement:

Outside influences:

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

Prenegotiation Summary

COST ELEMENT	PROPOSED	OBJECTIVE	DIFFERENCE
Manufacturing			
Manufacturing Overhead			
Engineering			
Engineering Overhead			
Purchase Parts			
Commercial Items			
Material Overhead			
Other Direct Cost			
Subtotal			
G&A Expense			
Total Contractor Effort			
CAS 414 Cost of Money			
Total Cost			
Profit			
Total Price			

(vignette continued on next page)

End-of-Chapter Vignette
(continued)

Write an explanation of the difference and how you developed your objective. Be sure and include references to the contractor data and Government reports that were used in developing your objective.

Manufacturing

Manufacturing Overhead

Engineering

Engineering Overhead

Purchased Parts

Commercial Items

Material Overhead

Other Direct Cost

G&A Expenses

Total Contractor Effort

CAS 414 Cost of Money

Profit

Chapter Vignette

Putting It In Perspective

Andrew was surprised when Kay told him he wasn't really done. Now she wants him to review the cost realism of the radio procurement. She did tell him that he had, whether he knew it or not, been doing cost realism assessments all along. But, now, she wants him to review it again.

"You have done a good job", said Kay, "but, you need to step back and make sure that the total cost AS WELL AS the individual elements of cost make sense and are realistic. It has happened before where a complete analysis, using all the right techniques, resulted in an unrealistic price."

"She's the boss," Andrew says to himself. "Besides, I suppose it is possible to get so involved in the numbers that you can lose your perspective on what is reasonable and realistic."

Course Learning Objectives

At the end of this chapter, you will be able to identify the objectives of an effective cost realism analysis

Chapter Overview

Overview

In this chapter, you will learn to:

- assess the realism of the proposed cost
- estimate the most probable cost
- identify the elements of an effective cost realism analysis

Maps in This Chapter

This chapter includes the following maps:

14.1	Objectives and Purpose.....	14-4
14.2	Steps In Cost Realism Analysis	14-5
14.3	Resolving Unrealistic BAFOs In Competitive Acquisitions ...	14-8

(continued on next page)

14.1 Objectives and Purpose

Objectives

1. Determine whether proposed costs realistically reflect the effort to accomplish the needed work.
2. Estimate the most probable cost of performance if the proposed cost is not realistic.

In many ways, cost realism analysis resembles the investigation of suspected mistakes in bids. In both cases, the burden is on the offeror to verify that the price is realistic. In both cases, you can request the offeror to provide data to demonstrate that the price is realistic. In both cases, you may meet with offeror representatives to talk about apparent estimating deficiencies. If an offeror fails to demonstrate the realism of proposed price, you must consider the attendant risks to the Government in making the award decision.

Purpose

FAR 9.103(c)

FAR 15.608

Cost realism analysis is necessary to protect the Government from the risks associated with unrealistically low prices. Remember that “award of a contract to a supplier based on lowest evaluated price alone can be false economy if there is subsequent default, late deliveries, or other unsatisfactory performance resulting in additional contractual or administrative costs. While it is important that Government purchases be made at the lowest evaluated price, this does not require an award to a supplier solely because that supplier submits the lowest offer. A prospective contractor must affirmatively demonstrate its responsibility, including, when necessary, the responsibility of its proposed subcontractors.” In a cost realism analysis, your goal is to determine the offeror's understanding of the work and ability to perform the contract at the offered price.

Cost realism analysis is particularly important when evaluating competitive proposals for cost-reimbursement and incentive contracts, since those types of contracts only require the contractor to make a “good faith effort” to provide the deliverable for the estimated cost specified in the contract.

Why might a proposal understate costs? Among the many possible reasons:

- *Lack of an accurate understanding of requirements.* If an offeror underestimates the magnitude or complexity of the Government requirement, estimated costs could be so far below the probable cost as to preclude successful completion of the contract!

(continued on next page)

14.1 Objectives and Purpose (continued)

Purpose
(continued)

FAR 3.501

- *Insufficient proposal preparation coordination.* The cost proposal may not be consistent with the offeror's technical proposal. The inconsistency may occur as the result of inadequate coordination between the offeror's technical proposal team and its cost proposal team.
- *Deliberate effort by an offeror to understate price.* An offeror may offer an unrealistically low price in order to win a contract, with expectation of recouping all or most of any overrun if the contract is flexibly priced. If the contract is fixed price, the contractor may anticipate getting well on change orders or follow-on, sole source contracts.

When
Necessary

Even when adequate price competition exists, you:

- Should perform a cost realism analysis when:
 - The lowest price proposal is far out of line with other proposed prices or the Government's independent cost estimate.
 - A cost reimbursement or incentive contract is anticipated.
 - The proposal appears to be materially and mathematically unbalanced.
 - The solicitation contains new requirements that might not be fully understood by competing offerors.
 - You are concerned about quality (especially if one or more offerors have a track record of underpricing work and cutting corners during contract performance).
- May perform a cost realism analysis on other acquisitions.

Standard For
Review

Protests to the Comptroller General often challenge the agency's cost realism analyses. Historically, the Comptroller General has generally sustained the contracting officer's judgement on cost realism — as long as that judgement is informed, accurate, thorough, reasonably based, and not arbitrary.

14.2 Steps in Cost Realism Analysis

Steps

- 1. Obtain the necessary data.*
- 2. Assess the realism of proposed costs.*
- 3. If proposed cost is not realistic, develop your own estimate of most probable cost.*
- 4. Use your cost realism analysis in contract price negotiation.*

Step 1. Request the Necessary Data

FAR 15.607

When you anticipate performing a cost realism analysis, request the necessary data in the solicitation. However, if necessary, you can request data after the period for receipt of proposals. For example, you can request such data to verify an apparent mistake in the proposal (e.g., a proposal far out of line price-wise with other proposals).

FAR 15.804-
6(a)(2)

Partial or Limited Data. Generally request partial or limited data. Typically, this consists of an overall summary of all cost elements (on a par with FAR Table 15-2) and more detailed data on the most critical elements or sub-elements. For example, you might request detailed data only on direct labor and travel costs. When requesting partial or limited data in the solicitation, identify the desired data as specifically as possible.

Normally, do not ask the offerors to complete an SF 1411. Also state the offeror will not be required to certify the data (assuming adequate price competition).

FAR 15.804-
3(a)

Cost or Pricing Data. Generally do not request cost or pricing data (as defined in the FAR). Remember that a contracting officer may not “require submission or certification of cost or pricing data when the contracting officer determines that prices are ... based on adequate price competition ...” If, after the closing date for submission of proposals, you discover that adequate price competition does not exist and that no other exemption applies, you can require submission of certified cost or pricing data using the SF 1411 to determine price reasonableness.

(continued on next page)

14.2 Steps in Cost Realism Analysis

Step 1. Request the Necessary Data (continued)

Other Data. In addition to data from the offeror, also consider such sources of information as:

- Technical evaluations
- Procurement and program histories.
- Relevant market data (e.g., wage determinations, published cost estimating relationships, and the like).
- Cost estimating relationships, manning models, etc.
- Independent Government cost estimates.
- Cost estimating system reviews.
- Recent audit reports on the firm related to other proposals or contracts.

FAR 15.607

During discussions, DO NOT use data from other offerors to question the realism of the proposal on the table. Also, DO NOT disclose the price or any other information on competing offers to any offeror. Remember that auctioning techniques and technical leveling are prohibited.

Audit Support. Contracting officers may request audit support from the Defense Contract Audit Agency in determining whether proposed costs are reasonable, credible, and compatible with the proposal scope and effort. When responding to such a request, the auditors will coordinate with you on specific areas of risk, special procedures, and the appropriate audit service required to meet the needs of the request per the Request for Specific Cost Information (9-107) or Review of a Part of a Proposal (9-108). Even though auditors cannot examine the offeror's books (absent the SF 1411), they can provide such services as rate checks, desk audits, and critiques of limited or partial data from the offerors (including suggestions on additional information to request or questions to ask about the data). You may also consider inviting the auditors to factfinding meetings with representatives of the offerors.

(continued on next page)

14.2 Steps in Cost Realism Analysis

Step 2. Assess Cost Realism

Ask the following questions to determine whether proposed costs are realistic for the work to be performed.

- Do the proposed costs reflect an accurate understanding of contract requirements?
- Are the proposed costs consistent with the various elements of the technical proposal?
- Is the contractor likely to satisfactorily complete the contract on time at the proposed price or, for cost reimbursement contracts, within the total estimated cost in the proposal?

Question 1. Do the proposed costs reflect an accurate understanding of contract requirements? With the assistance of technical personnel, determine if the proposal is consistent with the technical and other solicitation requirements. Inconsistencies need to be identified and clarified. A lack of understanding of the technical requirements can lead to severe over or under pricing of the contract. Further, a lack of understanding can jeopardize successful contract completion.

Question 2. Are the proposed costs consistent with the various elements of the technical proposal? The cost proposal should be a dollars and cents representation of the technical proposal and must be consistent with the technical proposal. Inconsistencies can involve direct labor, direct material, or even indirect costs:

Example 1. The offeror has submitted a proposal on a contract that is part of a complex research program to develop and test a state-of-the-art analysis system. In the technical proposal, the offeror has proposed to use 10 doctoral level engineers in completing the effort over a 12-month period. Instead of the labor rate for doctoral engineers, the offeror has proposed the labor rate for engineering assistants. It would be impossible to hire the proposed types of engineers at that labor rate.

Example 2. The offeror has proposed to integrate a top-of-the-line handling material handling unit into a new system being designed for the Government. However, the price proposed is 50 percent less than the lowest known sales price for the item.

Example 3. The offeror has proposed to conduct a stringent test program in a special test facility located in the contractor's plant. The proposal does not include the overhead cost normally applied to test units using the test facility. Furthermore, the engineering overhead rate proposed is an off-site rate rather than the higher on-site rate.

(continued on next page)

14.2 Steps in Cost Realism Analysis

(continued)

Step 2. Assess Cost Realism

(continued)

Question 3. Is the contractor likely to satisfactorily complete the contract on time at the proposed price?

Even if the proposal is internally consistent and reflects an accurate understanding of the work, the offeror still may have underestimated the cost of carrying out the work. Underestimates will result in a contract that is underfunded. Underfunding increases the following contract related risks to the Government.

If the contract is fixed-price:

- Obtaining the additional funds will be the responsibility of the contractor. If funds are not available, the contractor could default or even go bankrupt.
- Even if funds are available, the contractor will likely attempt to save money by cutting costs in all phases of contract performance from contract administration to production operations

If the contract is cost reimbursement:

- Additional Government funds may be required to complete the project.
- If additional funds are not available, work on the project will stop. Even if additional funds are available, program delays while awaiting funds are possible.
- A contract that requires additional funds to complete the basic work is by definition a “cost overrun.” Government procurement has been often criticized for failure to protect the taxpayer's interests through poor cost management.

(continued on next page)

14.2 Steps in Cost Realism Analysis

(continued)

Step 3.
Estimate
Probable Cost

If the proposed cost is NOT realistic, develop your own estimate of the most probable cost of performing the work. Use relevant estimating tools and techniques to develop a realistic estimate of the total allowable cost that the contractor would most likely incur to perform the work if awarded the contract.

Step 4. Use
your findings
in negotiating
price

During discussions, identify to the offeror costs that appear to be unrealistically high or low.

In a sole source negotiation, never agree to a price that is unreasonably high or unreasonably low. If the offeror demands a price that is unreasonable and you have taken all authorized actions, refer the contract action to higher authority.

In a competitive negotiation, you can normally rely on the offeror's competitive instincts and business acumen to arrive at a reasonable price. However, costs that you have identified as unrealistic during negotiations should be changed or supported in the Best And Final Offer (BAFO). Review the BAFO for cost realism.

- If the BAFO in line for award is fair and reasonable, you can award to the firm with the offer that is most advantageous to the Government under the terms of the award criteria in the solicitation.
- If all BAFO prices are unreasonably high, reject them all whenever possible. The Comptroller General has held (B-237531.3 and B-235208) that the Government may cancel a negotiated procurement and resolicit based on the potential for increased competition or cost savings.
- If one or more prices are unreasonably low, you will need to take action appropriate to the contract type involved. The next section identifies those actions.

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions

Introduction

If a Best And Final Offer is unrealistically low, the action to take depends on whether the contract will be:

- Flexibly priced, or
- Fixed price.

Flexibly Priced Contracts

For the purposes of this text/reference, a “flexibly priced” contracts include both fixed price incentive contracts and all varieties of cost reimbursement contracts. Price and price-related factors generally are less important than other factors in awarding flexibly priced contracts. However, when price is a significant evaluation factor, you need a realistic cost estimate for every competing BAFO. Without realistic estimates, you cannot identify the BAFO that best meets the Government's needs.

Hence, if a BAFO is unrealistic in price, you must adjust the BAFO price to reflect your best estimate of the probable cost of the BAFO. Only then can you fairly evaluate the BAFO against other BAFOs. For instance, in a 1993 case, the Comptroller General ruled that

Comp. Gen.
B-250486

“When a cost-reimbursement contract is to be awarded, the offerors' estimated costs of contract performance should not be considered as controlling since the estimates may not provide valid indications of final actual costs, which, within certain limits, the agency is required to pay. ... the agency's evaluation of estimated costs thus should be aimed at determining the extent to which the offeror's estimates represent what the contract should cost, assuming reasonable economy and efficiency. {Hence} ... the agency made significant adjustments in the protestor's proposed costs, both for the TWT proposal and the solid-state proposal, adjusting the former upward by nearly \$284 million ... and the latter by \$236 million. ... Based on the hearing testimony and extensive agency documentation, we think that the cost adjustments were reasonable.”

You have considerable discretion in making these adjustments, as long as the adjustments are:

- Reasonable,
- Consistent with the facts, and
- Mathematically accurate.

However, you must consider each offeror's BAFO independently, based on that contractor's particular circumstances, approach, personnel, and other known unique factors. For example, DO NOT increase the proposed labor rates in a BAFO to those in the Government estimate if the contractor's collective bargaining agreement contains lower rates.

(continued on next page)

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

Flexibly Priced
Contracts
(continued)

The following pair of GAO decisions illustrate the role of cost realism analysis in evaluating offers for award of flexibly priced contracts.

**B-238402, Matter of:
ASSOCIATES IN RURAL DEVELOPMENT, INC.
May 23, 1990**

Digest

1. Where the solicitation indicates that cost will be evaluated but does not indicate its specific weight relative to technical factors, it is presumed that cost and technical factors will be considered to be approximately equal in importance.
2. Award to a lower-cost offeror receiving lower technical score was proper where agency reasonably concluded that point scores overstated protester's technical advantage and any actual advantage did not justify the cost premium involved.

Decision

Associates in Rural Development, Inc. (ARD), protests the award of a contract to Louis Berger International, Inc. (LBI), under request for proposals (RFP) No. 89-023, issued by the Agency for International Development (AID), for an agricultural development and assistance project in Guatemala. ARD asserts that AID's failure to give more weight to technical factors than to cost in the evaluation of proposals was an improper departure from the solicitation's evaluation scheme; it also challenges the cost/technical tradeoff and the assessment of the realism LBI's proposed costs. We deny the protest.

The RFP provided for award of a cost-plus-fixed-fee contract to provide technical assistance services.... The solicitation indicated that proposals would be evaluated on the basis of the following technical evaluation factors: contractor personnel (60 points); technical criteria, including management approach, technical plan and understanding of the project (20 points); and corporate qualifications (20 points). With regard to cost, the solicitation stated that "while no points are shown for cost evaluation, offerors should assume that cost will be evaluated."

Five proposals were received in response to the solicitation. Following technical and cost discussions, three offerors were retained in a revised competitive range, and were requested to submit best and final offers (BAFOs). ARD's BAFO, proposing a cost of \$4,060,851, received the highest technical score, 87.0 points, while LBI's BAFO, proposing a cost of \$3,681,035, received a technical score of 78.8 points. AID determined that LBI, at agency direction, had failed to include in its proposed cost the cost of certain paid leave, thus resulting in a level of effort that appeared to be somewhat reduced from the level of effort set forth in the RFP. The agency concluded, however, that LBI in fact was proposing the level of effort in the solicitation, but charging paid leave to overhead rather than accounting for it as a direct charge; nevertheless, so as to avoid any question as to whether proposals were being evaluated on an equal basis, the agency adjusted LBI's proposed cost upward by \$144,277 to an evaluated cost of \$3,825,312. LBI's evaluated, final proposed cost, however, remained \$235,539 lower than ARD's.

* * * * *

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

**B-238402, Matter of:
ASSOCIATES IN RURAL DEVELOPMENT, INC.
(Continued)**

Cost Realism

Finally, ARD asserts that, based on the wide difference between its own and LBI's proposed costs, AID could not reasonably have concluded that LBI's low proposed costs were realistic. It questions whether any cost realism analysis was conducted, and believes that the agency's cost evaluation was based only on cost estimates as submitted, without consideration of the realism of the discrete elements of those cost estimates.

We find no support in the record for ARD's contentions. **Where a cost reimbursement contract is contemplated, the contracting agency must analyze each offeror's proposed costs for realism, since regardless of the cost proposed, the government will be bound to pay the contractor its actual and allowable costs.** See *Informatics Gen. Corp.*, B-224182, Feb. 2, 1987, 87-1 CPD P 105. The evaluation of competing cost proposals requires the exercise of informed judgement by the contracting agency involved, since it is in the best position to assess the "realism" of cost and technical approaches and must bear the major criticism for the difficulty or expenses resulting from a defective cost analysis. *Dayton T. Brown, Inc.*, B-229664, *supra*.

We have reviewed AID's evaluation of proposed costs and find that, contrary to ARD's assertions, the agency performed a cost realism analysis of all proposals, and that the analysis included an assessment of specific elements of the proposed costs. For example, in evaluating initial proposals, AID noted that LBI's insurance costs were excessive; as a result, after discussions, LBI reduced those costs in its final proposal. With respect to ARD's proposal, the agency noted that the initially proposed rate for general and administrative expenses appeared excessive; questioned ARD's proposed material handling charge and insurance costs; found that its proposed fixed fee was excessive; and advised ARD that salaries for several proposed consultants were extremely high. Further, the record shows that AID's cost realism analysis reasonably determined that LBI's proposed cost was not, as ARD asserts, unrealistically low. In that regard, the agency made detailed comparisons of the proposed cost elements with the government's own estimates for those elements. Although the agency made an upward adjustment in LBI's overall proposed cost to account for omitted leave and adjustments to specific cost items such as salary, fringe benefits, overhead, and living quarters, we note that LBI's overall, final proposed salary costs exceeded both the government estimate and ARD's proposed salary costs. LBI's proposed cost in another major area, overhead, also exceeded ARD's. Accordingly, we find no basis for ARD's assertion that LBI's proposed costs are unrealistically low.

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

**B-237054, Matter of:
EER SYSTEMS CORPORATION
January 29, 1990**

Digest

The procuring agency made a proper cost/technical analysis in determining to make award to a higher technically rated, higher cost offeror over protester's significantly lower rated, lower cost proposal where the record shows that the agency reasonably found that the protester's low cost approach may not allow for the quality of work and personnel contemplated by the solicitation as indicated by the protester's entry level labor rates and excessive hours proposed to accomplish the sample task.

Decision

The RFP provides that "the government will select for award that proposal offering the best value for the Government with equal consideration given to each evaluation factor and subfactor." The evaluation factors listed in the RFP are: (1) qualification of personnel (2) adequacy of facilities and equipment (3) offeror's response to the sample task, and (4) geographic locations. ... Finally, the RFP states that proposals will be evaluated on a cost realism basis to evaluate the prospective contractor's understanding of the scope of work and his ability to organize and perform the proposed contract. Cost is not otherwise mentioned in the evaluation criteria.

The Army received eight proposals and five were included in the competitive range with EER's proposal having the lowest rating of the five. Discussions were held with the technically acceptable offerors, and best and final offers (BAFOs) were received. The record shows that a cost and quantitative/qualitative analysis, and a best value analysis were performed on the BAFOs. SFA received a final technical score of 96 compared to EER's score of 74. EER's final evaluated cost proposal for the base year and 2 option years was the lowest at \$7,175,830, as compared with SFA's proposal of \$8,364,401. SFA was selected for award on September 13, 1989.

The Army also concluded that even though EER proposed the lowest cost, it may not provide the lowest cost to the government due to its inefficiency and less qualified personnel. **In this regard, we have consistently found that where a cost reimbursement contract is to be awarded, the offerors' proposed estimated costs of performance should not be considered as controlling, since they may not provide valid indications of the actual costs which the government is, within certain limits, required to pay.** Bendix Field Eng'g Corp., B-230076, May 4, 1988, 88-1 CPD P 437.

The record confirms that the proposal evaluation board, from the submission of initial proposals, was concerned about the low cost of EER's offer because it contained "entry level" labor rates, which made the agency question whether EER could deliver quality personnel and work as demanded by the contract. This concern about the possible high cost and lack of efficiency of EER was reinforced by EER's response to the sample task which included 36 percent more labor than the government estimate. During discussions, these concerns were expressly brought to EER's attention. However, EER only made minor adjustments in the hours in the sample task proposal.

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

Firm Fixed-
Price Contracts

Comp. Gen.
B-238259

When negotiating firm fixed-price contracts, you may NOT adjust the price prior to making cost/technical tradeoffs. The Comptroller General has ruled that adjusting a proposed fixed-price, “followed by evaluation of the adjusted price for reasonableness, is inappropriate since a fixed-price contract is not subject to adjustment based on the contractor's cost experience during performance, and thus places full responsibility for costs above the fixed-price directly upon the successful offeror.” Instead, for firm fixed-price contracts, use cost realism analysis in evaluating offers.

FAR 15.605(b)

Cost or price realism often takes the form of an explicit evaluation factor. This is encouraged by the FAR, which identifies “cost realism” as among the relevant factors to consider. For example, in case B-238259, the RFP provided that prices would be evaluated for both reasonableness and realism, with the former being of greater importance than the latter. the Comptroller General approved the use of cost realism analysis to assess “risk involved in an offeror's proposal—i.e., to judge the degree of risk by calculating the extent to which the proposed price falls short of the amount the agency believes is required to perform as proposed.” The contracting officer concluded that the lowest priced BAFO was predicated on unrealistically low rates of compensation for its employees. This raised doubts about its ability to retain qualified personnel. Therefore, the contracting officer properly selected a higher priced offer for award.

Comp. Gen.
B-238259

Cost realism also may be a consideration in applying other technical and business management factors. In a 1990 case, for example,

Comp. Gen.
B-237555

“Award was to be made on the basis of the offer providing the best overall value to the government based on four evaluation factors listed in the solicitation in descending order of importance—manufacturing/production, cost/price, product reliability, and management. ... FIDS received a marginal rating in all three non-price evaluation areas primarily because of an inadequately substantiated drop in its BAFO price, a history of poor past performance and alleged quality control deficiencies. The evaluators specifically found that a substantial performance risk was associated with FIDS' proposal because FIDS' final proposed price of \$56,057,000, which was the lowest received, represented a significant, insufficiently explained decrease of \$19.6 million (26 percent) from its initial price.

... The risk of poor performance when a contractor is forced to perform at little or no profit is, in general, a legitimate concern in the evaluation of proposals. ... An agency may properly downgrade a BAFO as being technically deficient when it does not contain an adequate explanation of price reductions from a previously acceptable initial proposal and may, where consistent with the terms of the RFP, award to a higher-priced technically superior offeror.

(continued on next page)

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

Firm Fixed- Price Contracts (continued)

“... Here, the record indicates that [the protestor's] ... price reduction was not adequately explained as required by the RFP. [The protestor's] ... BAFO merely contained general statements supporting the reduction without any detailed or persuasive explanation for it. [The protestor] ... failed to explain how the price reduction affected its technical proposal generally and the labor hours proposed specifically. ... We therefore conclude that the agency reasonably considered [the protestor's] ... proposal marginal because it concluded that the firm's low fixed price represented a significant performance risk.”

FAR 15.608

When award is to be made to the lowest price, technically acceptable proposal, cost realism may be an issue in determining whether the offer is technically acceptable or whether the proposed price is a mistake. Remember that a purpose of cost or price analysis is not only to determine whether the price is reasonable but also to “determine the offeror's understanding of the work and ability to perform the contract.”

Comp. Gen.
B-238099.2

On the other hand, do not reject an offer simply because the offer in your judgement is below-cost. “The submission of a below cost or low-profit offer is not illegal and provides no basis for challenging the award of a firm, fixed-priced contract to an otherwise responsible contractor”. Rather, the question is whether the offeror is likely to satisfy the Government requirement at the below-cost price. Remember that the offeror has the burden of affirming its capability to perform at that price.

(continued on next page)

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

B-238259, Matter of Technology Applications, Inc.

May 4, 1990

Digest

1. Where a fixed-price contract is to be awarded, adjustment of proposals for price realism during evaluation for purposes other than to assess the risk in an offeror's approach is inappropriate since a fixed-price contract is not subject to adjustment based on the contractor's cost experience during performance.
2. Agency may properly select for award a more highly rated, higher-priced proposal despite the fact that solicitation provides for price to be the most important evaluation factor, where it determines that technical superiority of higher-priced proposal is worth the additional cost.
3. Where solicitation asks offerors to respond to several sample tasks for the purpose of testing their understanding of the technical requirements of the contemplated contract, agency is not required to spell out for the protester during discussions all weaknesses in its responses to the tasks since the purpose of the sample tasks is to see if the offeror can identify and resolve technical issues itself.

Decision

The RFP contemplated the award of a combination firm, fixed-price/indefinite quantity contract with an award fee provision. ... The RFP required each offeror to submit a technical/management proposal and a cost proposal. The solicitation advised offerors that in the evaluation of proposals, cost would be the most important area, but that a proposal meeting solicitation requirements with the lowest price would not necessarily be chosen if award based on a higher-priced proposal afforded the government greater overall benefit. As part of their technical proposals, offerors were asked to address four sample tasks outlined in the solicitation. Through their responses to sample tasks ... offerors were to demonstrate their understanding of [the requirement] and ability to [perform the work]. Offerors were advised that for each task, they should provide specific experiential examples of similar problems that they had previously encountered and resolved.

Price Evaluation

TAI contends that the Navy deviated from the evaluation criteria set forth in the solicitation by failing to evaluate and assign it a high score for price reasonableness. The protester maintains that the RFP provided for the adjustment of prices for realism and the evaluation of prices, as adjusted, for reasonableness.

The RFP provided that prices would be evaluated for both reasonableness and realism, with the former being of greater importance than the latter. The RFP further provided, with regard to price reasonableness, that: "The Government will assess the reasonableness of the offeror's proposed cost, adjusted if necessary (for realism), by comparing it to the Government's budgeted or should cost estimate where the lowest realistic cost is scored highest." We do not think that the agency could properly have applied this provision in evaluating proposals given that it contemplates the adjustment of prices for realism and the evaluation of those adjusted prices for reasonableness. Where a fixed-priced contract is to be awarded, prices may be adjusted for realism only as part of an assessment of the risk involved in an offeror's proposal—i.e., to judge the degree of risk by calculating the extent to which the proposed price falls short of the amount the agency believes is required to perform as proposed; this is in essence what the Navy did here. See *Systems & Processes Eng'g Corp.*, B-234142, May 10, 1989, 89-1 CPD P 441.

Adjustment of a proposed fixed price, followed by evaluation of the adjusted price for reasonableness, is inappropriate since a fixed-price contract is not subject to adjustment based on the contractor's cost experience during performance, and thus places full responsibility for costs above the fixed price directly upon the successful offeror. See *Litton Sys., Inc., Electron Tube Div.*, B-215106, Sept. 18, 1984, 84-2 CPD P 317.

14.3 Resolving Unrealistic BAFOs In Competitive Acquisitions (continued)

**B-238259, Matter of:
Technology Applications, Inc.
(Continued)**

Adjustment of a proposed fixed price, followed by evaluation of the adjusted price for reasonableness, is inappropriate since a fixed-price contract is not subject to adjustment based on the contractor's cost experience during performance, and thus places full responsibility for costs above the fixed price directly upon the successful offeror. See Litton Sys., Inc., Electron Tube Div., B-215106, Sept. 18, 1984, 84-2 CPD P 317.

While the Navy thus could not properly evaluate TAI's adjusted price for reasonableness, as the RFP appears to contemplate, we do not think that TAI was prejudiced as a result. ... it is clear from the record that the Navy did take into consideration the fact that the protester's price was low. The PRB recognized in its source selection memorandum that TAI had submitted the lowest BAFO price, but concluded that its proposal posed an unacceptable performance risk since TAI had proposed unrealistically low rates of compensation for its employees, which raised doubts as to its ability to retain qualified personnel. Furthermore, in his statement, the contracting officer acknowledged that TAI's price was lower than Vitro's, but concluded that the superiority of Vitro's proposal in the technical and management areas justified the added expenditure. We therefore find that although the agency did not formally assign TAI a high rating for price reasonableness, it adequately considered the reasonableness of the protester's price, and nevertheless determined that award to TAI was not warranted in light of the overall performance risk associated with its proposal and Vitro's technical superiority.

End-of-Chapter Vignette

Get through this one and you don't have to help Andrew any more (at least not on this case). Give him some good answers that really show an in-depth knowledge of cost realism.

- 1. Based on the available data, does WEC have an accurate understanding of the requirements?*
- 2. Are the cost estimates realistic given the technical requirements?*
- 3. Is the price of the procurement reasonable?*

ACRONYMS

ACRONYMS

ACO.....	Administrative Contracting Officer
B & P.....	Bid and Proposal
BAFO.....	Best and Final Offer
CAS.....	Cost Accounting Standards
CASB.....	Cost Accounting Standards Board
CASB-CMF.....	Cost Accounting Standards Board- Cost of Money Factors
CER.....	Cost Estimating Relationships
CESR.....	Contractor Estimating System Review
COR.....	Contractor Operations Review
CPAF.....	Cost-Plus-Award-Fee
CPFF.....	Cost-Plus-Fixed-Fee
CPI.....	Consumer Price Index
CPIF.....	Cost-Plus-Incentive Fee
CPSR.....	Contractor Purchasing System Review
CSSR.....	Contractor System Status Review
DFAR.....	Defense Federal Acquisition Regulation
DOD.....	Department of Defense
DOE.....	Department of Energy
FAR.....	Federal Acquisition Regulation
FFP.....	Firm Fixed Price
FIFO.....	First-In-First-Out
FPEPA.....	Fixed-price with Economic Price Adjustment

ACRONYMS

FPIF	Fixed-price Incentive Firm
FPIS	Fixed-price Incentive Successive Targets
FPRA	Forward Pricing Rate Agreement
FPRP	Fixed-price Prospective Price Redetermination
FPRR	Fixed-price Retroactive Price Redetermination
G&A	General and Administrative
GAAP	Generally Accepted Accounting Principles
GAO	Government Accounting Office
GFP	Government Furnished Property
IR&D	Internal Research and Development
LIFO	Last-In-First-Out
NASA	National Aeronautics and Space Administration
NBV	Net Book Value
NCMA	National Contract Management Association
ODC	Other Direct Cost
PF&D	Personal, Fatigue, and Delay
PNM	Price Negotiation Memorandum
PPI	Producer Price Index
R&D	Research and Development
SF	Standard Form
SOW	Statement of Work

ACRONYMS

GLOSSARY

GLOSSARY

ACTUAL COST

FAR 31.001

Amounts determined on the basis of costs incurred, as distinguished from forecasted costs. Actual costs include standard costs properly adjusted for applicable variances.

ADEQUATE PRICE COMPETITION

FAR 15.804-3(b)

Price competition exists if—

- Offers are solicited;
- Two or more responsible offerors that can satisfy the Government's requirements submit priced offers responsive to the solicitation's expressed requirements; and
- These offerors compete independently for a contract to be awarded to the responsible offeror submitting the lowest evaluated price.

Price competition is presumed adequate unless—

- The solicitation is made under conditions that unreasonably deny to one or more known and qualified offerors an opportunity to compete;
- The low offeror has such a decided advantage that it is practically immune from competition; or
- There is a finding, supported by a statement of the facts and approved at a level above the contracting officer, that the lowest price is unreasonable.

ALLOCABLE COST

FAR 31.201-4

A cost is allocable to a Government contract if it—

- Is incurred specifically for the contract;
- Benefits both the contract and other work, and can be distributed to them in reasonable proportion to the benefits received; or
- Is necessary to the overall operation of the business, although a direct relationship to any particular cost objective cannot be shown.

ALLOCATE

FAR 31.001

To assign an item of cost, or a group of items of cost, to one or more cost objectives. This term includes both direct assignment of cost and the reassignment of a share from an indirect cost pool.

ALLOCATION BASE

Some measure of direct contractor effort that can be used to allocate pool costs based on benefits accrued by the several cost objectives. Examples of typical bases:

- Direct labor hours
- Direct labor dollars
- Number of units produced
- Number of machine hours.

GLOSSARY

ALLOWABLE COST	<p>A cost that may properly be charged to a Government contract. Factors considered in determining whether a cost is allowable:</p> <ol style="list-style-type: none">(1) Reasonableness.(2) Allocability.(3) Standards promulgated by the CAS Board, if applicable; otherwise, generally accepted accounting principles and practices appropriate to the particular circumstances.(4) Terms of the contract.(5) Any limitations set forth in FAR subpart 31.2 (for commercial organizations).
ASSIST AUDIT	<p>An audit of subcontractor cost or pricing data.</p>
AUDIT <i>FAR 52.215-2</i>	<p>A review of a company's accounting procedures, accounting practices, books, records, documents, and other evidence related to (a) cost or pricing data or (b) costs claimed to have been incurred or anticipated to be incurred in performing a contract.</p>
BASE	<p>See Allocation Base.</p>
BEST AND FINAL OFFER (BAFO) <i>FAR 15.611</i>	<p>In competitive negotiations, proposals prepared by offerors in the competitive range following completion of discussions and receipt of a written request for BAFOs from the contracting officer.</p>
BID AND PROPOSAL (B&P) COSTS <i>FAR 31.205-18</i>	<p>Costs incurred in preparing, submitting, and supporting bids and proposals (whether or not solicited) on potential Government or non-Government contracts. The term does not include the costs of effort sponsored by a grant or cooperative agreement or required in contract performance.</p>
BILL OF MATERIALS	<p>A listing of all the materials, including the part numbers and quantities of all the parts, necessary for the project.</p>
BILLING RATE <i>FAR 42.701</i>	<p>An indirect cost rate (a) established temporarily for interim reimbursement of incurred indirect costs and (b) adjusted as necessary pending establishment of final indirect cost rates.</p>
CASH EXPENDITURE	<p>An actual outlay or dollars in exchange for goods and services.</p>
CLASS OF POSITIONS	<p>All positions that share the same title and pay level.</p>

GLOSSARY

CLAUSE <i>FAR 52.101(a)</i>	A term or condition used in contracts or in both solicitations and contracts, and applying after contract award or both before and after award. Clauses state the rights and obligations of the parties to a contract.
COMMERCIAL ITEM <i>FAR 15.804-3(c)(3)</i>	Supplies or services regularly used for other than Government purposes and sold or traded to the general public in the course of normal business operations.
COMPARISON ESTIMATING	Estimates of the cost of performing work under a contract made by (1) determining the historical cost of the same or of a similar item and (2) adjusting or projecting the historical cost the work to be performed. Comparisons are used in estimating individual elements of cost and/or the total price of the contract.
COMPETITIVE RANGE <i>FAR 15.609 and 15.610</i>	All proposals that the CO determines have a reasonable chance of being selected for award, based on cost or price and other factors that were stated in the solicitation. Unless the CO decides to award without discussions, the CO must conduct written or oral discussion with all responsible offerors who submit proposals within the competitive range.
CONSUMER PRICE INDEX	An index published monthly which reports consumer prices for a fixed mix of goods.
CONTINGENCY <i>FAR 31.205-7(a)</i>	A possible future event or condition arising from presently known or unknown causes, the outcome of which is indeterminable at the present time.
CONTRACT <i>FAR 2.1</i>	A mutually binding legal relationship obligating the seller to furnish supplies or services (including construction) and the buyer to pay for them.
CONTRACT COST (TOTAL) <i>FAR 31.201-1</i>	The sum of the allowable direct and indirect costs allocable to the contract, incurred or to be incurred, less any allocable credits, plus any allocable cost of money pursuant to FAR 31.205-10. In ascertaining what constitutes a cost, any generally accepted method of determining or estimating costs that is equitable and is consistently applied may be used, including standard costs properly adjusted for applicable variances.

GLOSSARY

CONTRACT COST RISK <i>15.905-1(b)</i>	A profit analysis factor which measures the degree of cost responsibility and associated risk that the prospective contractor will assume (1) as a result of the contract type contemplated and (2) considering the reliability of the cost estimate in relation to the complexity and duration of the contract task.
CONTRACT MODIFICATION <i>FAR 43.101 and 43.103</i>	Any written change in the terms of a contract. Unilateral modifications are signed only by the CO; bilateral by both parties.
CONTRACT TYPE <i>FAR 16.101</i> <i>FAR 16.101</i>	(1) The name of the compensation arrangement established by the terms and conditions of the contract, such as Firm Fixed Price, Fixed Price Redeterminable, Cost Plus Award Fee, Cost Plus Fixed Fee, or Cost Plus Incentive Fee. (2) The name of the ordering arrangement established by the terms and conditions of an indefinite delivery contract, such as Definite Quantity, Indefinite Quantity, or Requirements.
CONTRACTING <i>FAR 2.1</i>	The purchasing, renting, leasing, or otherwise obtaining supplies or services from nonfederal sources.
CONTRACTING ACTIVITY <i>FAR 2.1</i>	An element of an agency designated by the agency head and delegated broad authority regarding acquisition functions.
CONTRACTING OFFICER (CO) <i>FAR 2.1</i>	An agent of the Government with authority to enter into, administer, or terminate contracts and make related determinations and findings.
CONTRACTING OFFICER'S REPRESENTATIVE (COR)	A Federal employee to whom a Contracting Officer has delegated limited authority in writing to make specified contract-related decisions. Depending on the type of authority delegated, may be referred to as the Contracting Officer's Technical Representative (COTR).
CONTRACTOR EFFORT <i>15.905-1(a)</i>	A profit analysis factor which measures the complexity of the work and the resources required of the prospective contractor for contract performance.

GLOSSARY

CONTRACTOR ESTIMATING SYSTEM REVIEW <i>FAR 15.811(a)</i>	Reviews by cognizant audit activities of selected contractors' estimating systems or methods, in order to (1) reduce the scope of reviews to be performed on individual proposals, (2) expedite the negotiation process, and (3) increase the reliability of proposals.
CONTRACTOR PURCHASING SYSTEM REVIEW (CPSR)	A periodic audit by a Government team of a prime contractor's purchase order records and purchasing policies and procedures. The objective is to ensure that the Government's interests are being adequately protected by the prime contractor.
CONTRIBUTION INCOME	The difference between revenue and variable cost. The term contribution income comes from the contribution made to covering fixed costs and profit.
COST	<p>The amount of money expended (outlays) in acquiring supplies or services. The total cost of an acquisition includes:</p> <ul style="list-style-type: none">• The dollar amount paid to the contractor under the terms and conditions of the contract.• Any direct costs for acquiring the supplies or services not covered in the contract price.• Any cost of ownership not covered in the contract price.• The Government's overhead for awarding and administering the contract.
COST ACCOUNTING STANDARDS (CAS)	Standards for the measurement, assignment, and allocation of costs to contracts with the United States. These standards are established by the Cost Accounting Standards Board and incorporated in Part 30 of the FAR and FAR Appendix B.
COST ACCOUNTING SYSTEM	The policies, procedures and practices of a business entity for (1) recording, (2) verifying, (3) accumulating, and (4) allocating costs incurred by the entity.
COST ANALYSIS <i>FAR 15.801</i>	The review and evaluation of the separate cost elements and proposed profit of (a) an offeror's or contractor's cost or pricing data and (b) the judgmental factors applied in projecting from the data to the estimated costs in order to form an opinion on the degree to which the proposed costs represent what the cost of the contract should be, assuming reasonable economy and efficiency.
COST DRIVERS	Those aspects of the proposal that if changed would have a major impact on proposed cost. Two of the common cost drivers are delivery terms and technical specifications

GLOSSARY

COST ESTIMATING RELATIONSHIP (CER)	An established relationship between unit price or some other measure of cost (e.g., the dependent variable) and an independent variable(s).
COST ESTIMATING SYSTEM	Policies, procedures, and practices of a business entity for estimating the probable costs of performing work under a contract or contract modification.
COST OBJECTIVE <i>FAR 31.001</i>	“Cost objective” means a function, organizational subdivision, contract, or other work unit for which cost data are desired and for which provision is made to accumulate and measure the cost of processes, products, jobs, capitalized projects, etc.
COST OR PRICING DATA <i>FAR 15.801</i>	All facts as of the date of price agreement that prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental, and are therefore verifiable. While they do not indicate the accuracy of the prospective contractor’s judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.
COST REALISM ANALYSIS	An analysis of cost proposals from offerors to (1) determine whether proposed costs realistically reflect the effort to accomplish the needed work and (2) estimate the most probable cost of performance if the proposed cost is not realistic
COST REIMBURSEMENT CONTRACTS <i>FAR 16.301-1</i>	Contracts that provide for payment of allowable incurred costs, to the extent prescribed in the contract. These contracts establish an estimate of total cost for the purpose of obligating funds and establishing a ceiling that the contractor may not exceed (except at its own risk) without the approval of the contracting officer.
COST-TO-COST RELATIONSHIP	A CER in which the relationship is between one cost and another cost.
COST-VOLUME-PROFIT ANALYSIS	A technique for estimating unit costs and profit for different production volumes of the same item.

GLOSSARY

DEFECTIVE COST OR PRICING DATA

FAR 15.804-7

Cost or pricing data are found to be inaccurate, incomplete, or noncurrent as of the date of final agreement on price given on the contractor's or subcontractor's Certificate of Current Cost or Pricing Data

DEPRECIATION

FAR 31.205-11(a)

A charge to current operations which distributes the cost of a tangible capital asset, less estimated residual value, over the estimated useful life of the asset in a systematic and logical manner. Useful life refers to the prospective period of economic usefulness in a particular contractor's operations as distinguished from physical life; it is evidenced by the actual or estimated retirement and replacement practice of the contractor.

DESIGN SPECIFICATION

A purchase description that establishes precise measurements, tolerances, materials, in process and finished product tests, quality control, inspection requirements, and other specific details of the deliverable.

DETAILED COST ESTIMATE

(1) An estimate of material costs based on a list of material items, showing the required quantity and unit price of each item (see also Bill of Materials). (2) Cost estimates based on a thorough review of all components, processes, and assemblies (in contrast to comparison and round-table estimating).

DIRECT COST

FAR 31.202

Any cost that can be identified specifically with a particular final cost objective (see also Labor Costs and Material Costs).

DIRECTLY ASSOCIATED COST

FAR 31.001

Any cost which is generated solely as a result of the incurrence of another cost, and which would not have been incurred had the other cost not been incurred.

DISCUSSIONS

FAR 15.601

Any oral or written communication between the Government and an offeror, (other than communications conducted for the purpose of minor clarification) whether or not initiated by the Government, that (a) involves information essential for determining the acceptability of a proposal, or (b) provides the offeror an opportunity to revise or modify its proposal.

ECONOMIC RISK

The probability of regaining one's money with a reasonable profit from an investment versus not making a profit, or, even worse, losing the investment. The higher the risk of an investment, i.e., the higher the probability of losing the investment, the higher the potential profit must be in order to persuade an investor to take the risk.

GLOSSARY

EFFICIENCY FACTOR	<p>A measure of the difference between the labor time standard and actual time required for the task. A realization factor will normally be calculated from historical data as:</p> $\text{Efficiency Factor} = \frac{\text{Standard Hours}}{\text{Actual Hours}} * 100$
ESTABLISHED CATALOG PRICES <i>FAR 15.804-3(c)(1)</i>	<p>Prices recorded in a form regularly maintained by the manufacturer or vendor. This form may be a catalog, price list, schedule, or other verifiable and established record. The record must (1) be published or otherwise available for customer inspection and (2) state current or last sales price to a significant number of buyers constituting the general public</p>
ESTABLISHED MARKET PRICES <i>FAR 15.804-3(c)(2)</i>	<p>Current prices that (1) are established in the course of ordinary and usual trade between buyers and sellers free to bargain and (2) can be substantiated by data from sources independent of the manufacturer or vendor.</p>
ESTIMATING COSTS <i>FAR 31.001</i>	<p>The process of forecasting a future result in terms of cost, based upon information available at the time.</p>
EXPENSE ACCRUAL	<p>An expense recorded for accounting purposes when the obligation is incurred, regardless of when cash is paid out for the goods or services.</p>
EXPRESSLY UNALLOWABLE COST	<p>A particular item or type of cost which, under the express provisions of an applicable law, regulation, or contract, is specifically named and stated to be unallowable.</p>
EVALUATED PRICE	<p>The price of an offer after application of price-related factors in the solicitation. Similarly, contracting officers must determine the "evaluated total estimated cost" of Best and Final Offers in competitive procurements of cost reimbursable contracts.</p>
EVALUATION FACTORS <i>FAR 15.605</i>	<p>Factors in selecting an offer for award.</p>
FACILITIES CAPITAL	<p>The net book value of tangible capital assets and of those intangible capital assets that are subject to amortization.</p>

GLOSSARY

FACILITIES CAPITAL COST OF MONEY

FAR 31.205-10(a)

The cost of capital committed to facilities is an imputed cost determined by applying a cost-of-money rate to facilities capital employed in contract performance.

FACTFINDING

The process of identifying and obtaining information necessary to complete the evaluation of proposals. This may include factfinding sessions with offerors as provided in FAR 15.807a.

FAIR PRICE (see also REASONABLE PRICE)

From the perspective of a buyer, a fair price is a price that is in line with (or below) the fair market value of the contract deliverable (to the extent that fair market value can be approximated through price analysis). “Fair market value” is the price you **should** expect to pay, given the prices of bona fide sales between informed buyers and informed sellers under like market conditions in competitive markets for deliverables of like type, quality, and quantity.

When data on probable performance costs are available, a separate test of “fairness” is whether the proposed price is in line with (or below) the total allowable cost of providing the contract deliverable that would be incurred by a well managed, responsible firm using reasonably efficient and economical methods of performance + a reasonable profit.

From the perspective of a seller, a fair price is a price that is realistic in terms of the seller's ability to satisfy the terms and conditions of the contract.

FEDERAL ACQUISITION REGULATION (FAR)

Uniform policies and procedures for acquisition by executive agencies. The FAR is jointly prescribed, prepared, issued and maintained by the Department of Defense, the General Services Administration, and the National Aeronautics and Space Administration.

FEE OR PROFIT

FAR 15.901(a)

Money paid to a contractor over and above total reimbursements for allowable costs.

FIELD PRICING SUPPORT

FAR 15.801

A review and evaluation of the contractor's or subcontractor's proposal by any or all field pricing support personnel.

GLOSSARY

FINAL INDIRECT COST RATE <i>FAR 42.701</i>	The indirect cost rate established and agreed upon by the Government and the contractor as not subject to change. It is usually established after the close of the contractor's fiscal year (unless the parties decide upon a different period) to which it applies. In the case of cost-reimbursement research and development contracts with educational institutions, it may be predetermined; that is, established for a future period on the basis of cost experience with similar contracts, together with supporting data.
FIRM FIXED PRICE CONTRACT <i>FAR 16.202-1</i>	A contract that establishes a price not subject to any adjustment on the basis of the contractor's cost experience in performing the contract.
FIRST-IN-FIRST-OUT (FIFO)	A method for pricing items in inventory. For accounting purposes, this method assumes that the first unit entered into the inventory is the first unit to be drawn out. The inventory value assigned to the unit drawn out is the value of the first unit recorded as still being in inventory.
FISCAL YEAR <i>FAR 31.001</i>	The accounting period for which annual financial statements are regularly prepared, generally a period of 12 months, 52 weeks, or 53 weeks.
FIXED COST	Costs that remain constant as volume varies in the relevant range of production. Examples: fire insurance, depreciation, facility rent, and property taxes.
FIXED PRICE CONTRACT <i>FAR 16.201</i>	A contract that establishes a firm price or, in appropriate cases, an adjustable price. Fixed-price contracts providing for an adjustable price may include a ceiling price, a target price (including target cost), or both. Unless otherwise specified in the contract, the ceiling price or target price is subject to adjustment only by operation of contract clauses providing for equitable adjustment or other revision of the contract price under stated circumstances.
FORWARD PRICING RATE AGREEMENT <i>FAR 15.801</i>	A written agreement negotiated between a contractor and the Government to make certain rates available during a specified period for use in pricing contracts or modifications. Such rates represent reasonable projections of specific costs that are not easily estimated for, identified with, or generated by a specific contract, contract end item, or task. These projections may include rates for labor, indirect costs, material obsolescence and usage, spare parts provisioning, and material handling.

GLOSSARY

**FORWARD
PRICING RATE
RECOMMENDATION**
FAR 15.801

A rate set unilaterally by the administrative contracting officer for use by the Government in negotiations or other contract actions when forward pricing rate agreement negotiations have not been completed or when the contractor will not agree to a forward pricing rate agreement.

**FORWARD PRICING
RATES**

Rates for estimating indirect costs that will be incurred by the firm during a given accounting period.

**FUNCTIONAL
SPECIFICATION**

A purchase description that describes the deliverable in terms of performance characteristics and intended use, including those characteristics which at minimum are necessary to satisfy the intended use.

**GENERALLY ACCEPTED
ACCOUNTING
PRINCIPLES**

Financial accounting standards pronounced by the Financial Accounting Standards Board or otherwise represented in general or industry practice.

**GENERAL AND
ADMINISTRATIVE (G&A)
EXPENSE**
FAR 31.001

Any management, financial, and other expense which is incurred by or allocated to a business unit and which is for the general management and administration of the business unit as a whole. G&A expense does not include those management expenses whose beneficial or causal relationship to cost objectives can be more directly measured by a base other than a cost input base representing the total activity of a business unit during a cost accounting period.

GENERAL PUBLIC
FAR 15.804-3(c)(5)

A significant number of buyers other than the Government or affiliates of the offeror; the item involved must not be for Government end use.

**GOVERNMENT
PROPERTY**
FAR 45.101

All property owned by or leased to the Government or acquired by the Government under the terms of the contract. It includes both (1) Government-furnished property and (2) property acquired or otherwise provided by the contractor for performing a contract and to which the Government has title.

**GOVERNMENT
FURNISHED PROPERTY**
FAR 45.101

Property in the possession of, or directly acquired by, the Government and subsequently made available to the contractor.

GLOSSARY

IMPROVEMENT CURVE	A technique for estimating recurring resource requirements in operations that are performed repetitively. Improvement curves can be used to estimate direct labor hours, units of material required, or the cost of subcontracted items. Unit improvement curves are based on the theory that, as <i>the total volume of units produced doubles, the cost per unit decreases by some constant percentage</i> . Cumulative average improvement curves are based on the theory that, as <i>the total volume of units produced doubles, the average cost per unit decreases by some constant percentage</i> .
INDEPENDENT RESEARCH AND DEVELOPMENT (IR&D) COST <i>FAR 31.001</i>	The cost of effort which is neither sponsored by a grant, nor required in performing a contract, and which falls within any of the following four areas: (a) basic research, (b) applied research, (c) development, and (d) systems and other concept formulation studies.
INDEX	A ratio, usually expressed as a percentage, indicating changes in values, quantities, or prices. Price index numbers measure changes in prices over time.
INDIRECT COST <i>FAR 31.203</i>	Any cost not directly identified with a single, final cost objective, but identified with two or more final cost objectives or an intermediate cost objective.
INDIRECT COST POOLS <i>FAR 31.001</i>	Groupings of incurred indirect costs.
INDIRECT COST RATE <i>FAR 42.701</i>	The percentage or dollar factor that expresses the ratio of indirect expense incurred in a given period to direct labor cost, manufacturing cost, or another appropriate base for the same period.
INTERORGANIZATIONAL TRANSFER	Materials, supplies, or services that are sold or transferred between any divisions, subsidiaries, or affiliates of the contractor under a common control.
INVENTORY	Goods purchased and held in stock for production and/or direct sale to customers.
INVESTMENT RISK	The probability of recovering the money invested in plant or equipment.

GLOSSARY

<p>JOB ORDER COSTING</p>	<p>Charging of costs to job orders. A job order may cover the production of one unit or a number of identical units. If the contract is for just one unit, the entire actual cost of the unit is accumulated under the job order.</p>
<p>LABOR COSTS <i>(i.e., compensation for personal services)</i> <i>FAR 31.205-6</i></p>	<p>All remuneration paid currently or accrued, in whatever form and whether paid immediately or deferred, for services rendered by employees to the contractor during the period of contract performance... It includes, but is not limited to, salaries; wages; bonuses (including stock bonuses); incentive awards; employee stock options, stock appreciation rights, and stock ownership plans; employee insurance; fringe benefits; incentive pay, location allowances, hardship pay, severance pay, and cost of living differential.</p>
<p>LABOR COST AT STANDARD <i>FAR 31.001</i></p>	<p>A preestablished measure of the labor element of cost, computed by multiplying labor-rate standard by labor-time standard.</p>
<p>LABOR HOUR CONTRACT <i>FAR 16.602</i></p>	<p>A variation of the time-and-materials contract, differing only in that materials are not supplied by the contractor.</p>
<p>LABOR LOADING SCHEDULE</p>	<p>A schedule of labor hours to be employed in contract performance, organized by time period and class of labor.</p>
<p>LABOR-RATE STANDARD <i>FAR 31.001</i></p>	<p>A preestablished measure, expressed in monetary terms, of the price of labor.</p>
<p>LABOR TIME STANDARD <i>FAR 31.001</i></p>	<p>(1) The time necessary for a qualified worker, working at a normal pace, under capable supervision, with normal fatigue and delays, to perform a defined task. The standard time is composed of three elements: leveled time; a personal fatigue, and delay (PF&D) allowance; and any special allowances. (2) A preestablished measure, expressed in temporal terms, of the quantity of labor.</p>
<p>LAST-IN-FIRST-OUT (LIFO)</p>	<p>A method for pricing items in inventory. For accounting purposes, this method assumes that the last unit added to inventory is the first unit to be drawn out. The inventory value assigned to the unit drawn out is the value of the last unit placed in inventory.</p>

GLOSSARY

LEVEL OF EFFORT ESTIMATING	An estimate of time spent on a repetitive or recurring function during a given period of time.
LEVELED TIME	The time that a worker of average skill, making an average effort under average conditions, would take to complete the required task.
LIFE CYCLE COST	The total cost of an item or system over its useful life. It includes the cost of development, production, ownership and, where applicable, disposal.
LIMITED OR PARTIAL DATA	Any uncertified data requested from offerors to support proposed prices.
LINE OF BEST FIT	A technique for estimating the value of a dependent variable (e.g., Price) by approximating a linear relationship between the dependent variable and an independent variable. This is done by finding a line that minimizes the distance between known data points and the line. The line can be fit visually, mathematically, or with the help of a calculator or computer. The final equation depends on the method used and the skill of the estimator.
MARKET RESEARCH <i>FAR 10.001</i>	Collecting and analyzing information about the entire market available to satisfy minimum agency needs to arrive at the most suitable approach to acquiring, distributing, and supporting supplies and services.
MATERIAL COSTS <i>FAR 31.205-26</i>	These include the costs of such items as raw materials, parts, sub-assemblies, components, and manufacturing supplies, whether purchased or manufactured by the contractor, and may include such collateral items as inbound transportation and intransit insurance. In computing material costs, consideration shall be given to reasonable overruns, spoilage, or defective work (unless otherwise provided in any contract provision relating to inspecting and correcting defective work).
MATERIAL COST AT STANDARD <i>FAR 31.001</i>	A preestablished measure of the material elements of cost, computed by multiplying material-price standard by material-quantity standard. "Material-price standard" means a preestablished measure, expressed in monetary terms, of the price of material. "Material-quantity standard" means a preestablished measure, expressed in physical terms, of the quantity of material.

GLOSSARY

MONTHLY LABOR REVIEW	A Bureau of Labor Statistics publication which includes selected data from a number of government indexes including: an employment cost index, consumer price index data, producer price indexes data, export price indexes data, and import price indexes data.
MOVING AVERAGE <i>FAR 31.001</i>	(1) An estimating technique. In a simple moving average, data collected over two or more time periods is summed and divided by the number of time periods. That number then becomes an estimate for future time periods. As data from a new time period is added, data from the earliest time period is dropped from the average. For example, a 12-month moving average uses data from the most recent 12 months. A 6-month moving average uses data from the last 6 months. (2) An inventory costing method under which an average unit cost is computed after each acquisition by adding the cost of the newly acquired units to the cost of the units of inventory on hand and dividing this figure by the new total number of units.
NEGOTIATION <i>FAR 15.102</i>	(1) A bargaining process between two or more parties seeking to reach a mutually satisfactory agreement or settlement on a matter of common concern. (2) A method of procurement prescribed in Part 15 of the FAR that includes the receipt of proposals from offerors, permits bargaining, and usually affords offerors an opportunity to revise their offers before award of a contract. Bargaining—in the sense of discussion, persuasion, alteration of initial assumptions and positions, and give-and-take—may apply to price, schedule, technical requirements, type of contract, or other terms of a proposed contract.
OTHER DIRECT COSTS <i>FAR Table 15-2</i>	Costs other than direct labor, direct materials, and indirect costs. Examples include special tooling, travel, computer and consultant services, preservation, packaging and packing, spoilage and rework, and Federal excise tax on finished articles.
PARAMETRIC RELATIONSHIP	A CER which relates cost to a parameter (characteristic) of the item or service being purchased.
PERFORMANCE ASSESSMENT REVIEW	This review, sometimes also known as Contractor Operations Review (COR) or Contractor Systems Status Review (CSSR), is conducted on major contractors by a specially assembled team. The purpose of this review is to assess the strength of contractor management systems.

GLOSSARY

PERFORMANCE RISK	Potential difficulty in successfully performing the work required by the contract. If the work is difficult and requires greater effort to accomplish with a relatively high risk of failure or defective units being produced, then this risk will be weighed and reflected in a higher estimated cost.
PERFORMANCE SPECIFICATION	A purchase description that describes the deliverable in terms of desired operational characteristics. Performance specifications tend to be more restrictive than functional specifications, in terms of limiting alternatives which the Government will consider and defining separate performance standards for each such alternative.
PERSONAL, FATIGUE, AND DELAY (PF&D) ALLOWANCE	An allowance added to Leveled Times in establishing Labor Time Standards. The Personal allowance considers time for a worker to take care of personal needs, such as trips to the rest room and drinking fountain. The Fatigue allowance considers time to recuperate from fatigue related to factors such as general working conditions, the nature of the work, and the health of the worker. The Delay allowance covers unavoidable, predictable, and nonpredictable delays for such activities as replenishing materials, rejecting nonstandard parts, making minor equipment repairs, and receiving instructions.
POOL	See Indirect Cost Pools
POSITION	The work, consisting of duties and responsibilities, assigned to an employee.
POSITION CLASSIFICATION PLAN	A plan that identifies the classes of labor employed by a firm, and provide guidelines for determining the title and pay level of each position in the firm. Guidelines are generally in the form of job factors, degree requirements, skill qualification requirements, conversion tables (such as the possible trade-offs between education and experience), and the like.
PREDETERMINED LEVEL TIMES (PLTs)	Leveled times established for basic body motions, such as reaching for a part or grasping a part. PLTs are then used to estimate leveled times for tasks comprised of various combinations of those motions. Also called Predetermined Standards or Basic Motion Standard Data.
PREPRODUCTION COSTS	Out of the ordinary costs associated with the initiation of production under a particular contract or program. Also known as start-up or non-recurring costs.

GLOSSARY

PRICE <i>FAR 15.801</i>	(1) A monetary amount given, received, or asked for in exchange for supplies or services. (2) Cost plus any fee or profit applicable to the contract type.
PRICE ANALYSIS <i>FAR 15.801</i>	The process of examining and evaluating a proposed price without evaluating its separate cost elements and proposed profit.
PRICE INDEX	See INDEX.
PRICE-RELATED FACTOR <i>FAR 14.201-8</i>	When evaluating offers for award, any factor applied in identifying that offer which would represent the lowest total cost to the Government.
PRIMARY POOL	An indirect cost pool for which a separate indirect cost rate is established.
PRIVITY	Privity refers to the direct contractual relationship that exists between parties. The Government has a contract with the prime contractor, therefore there is privity of contract between the Government and the prime contractor. However, the Government does not have a contract with a subcontractor; no privity of contract exists between the two parties.
PROCESS COSTING	Charging of costs to a process even though end-items (which may not be identical) for more than one contract are in process at the same time. At the end of the cost accounting period (usually one month), the costs incurred for that process are assigned to the units completed during the period and to the incomplete units still in process.
PROCUREMENT HISTORY	Contract files that include proposals from or awards to the offeror, regardless of the project or program supported by the contract.
PRODUCER PRICE INDEXES (PPI)	Indexes published monthly by the US Department of Labor, Bureau of Labor Statistics (BLS). The indexes report monthly changes in producer/wholesale prices. The PPI is divided into 15 major commodity groups. Each commodity group is broken into subgroups and individual items.
PROFIT	See Fee.

GLOSSARY

PROFIT CENTER <i>FAR 31.001</i>	The smallest organizationally independent segment of a company charged by management with profit and loss responsibilities.
PROGRAM HISTORY	Files on contracts for the same or comparable deliverables.
PROGRESS PAYMENTS <i>FAR 32.102(b)</i>	Payments made under a fixed price contract on the basis either of (1) costs incurred by the contractor as work progresses under the contract or (2) on physical progress in accomplishing the work.
PROPOSAL <i>FAR 31.001</i>	Any offer or other submission used as a basis for pricing a contract, contract modification, or termination settlement or for securing payments thereunder.
PURCHASE DESCRIPTION <i>FAR 10.001</i>	Describe the essential physical characteristics or functions required to meet the Government's minimum need.
REALIZATION FACTOR	<p>A measure of the difference between the labor time standard and actual time required for the task. A realization factor will normally be calculated from historical data as:</p> $\text{Realization Factor} = \frac{\text{Total Actual Hours}}{\text{Standard Hours}}$
REASONABLE COST <i>FAR 31.201-3</i>	A cost which, in its nature and amount, does not exceed that which would be incurred by a prudent person in the conduct of competitive business.
REASONABLE PRICE (See also FAIR PRICE)	A price that a prudent and competent buyer would be willing to pay for the contract deliverable, given adequate data on (1) market conditions, (2) alternatives for meeting the requirement, (3) the evaluated price of each alternative, and (4) non-price evaluation factors (in "best value" competitions).
REQUEST FOR PROPOSALS (RFP)	The solicitation in negotiated acquisitions

GLOSSARY

RESPONSIBLE OFFEROR <i>FAR 9.101</i>	<p>An offeror that meets the general and any special standards established under FAR 9.104. To be determined responsible under the general standards, a prospective contractor must—</p> <ul style="list-style-type: none">• Have adequate financial resources to perform the contract, or the ability to obtain them;• Be able to comply with the required or proposed delivery or performance schedule, taking into consideration all existing commercial and governmental business commitments;• Have a satisfactory performance record;• Have a satisfactory record of integrity and business ethics;• Have the necessary organization, experience, accounting and operational controls, and technical skills, or the ability to obtain them (including, as appropriate, such elements as production control procedures, property control systems, and quality assurance measures applicable to materials to be produced or services to be performed by the prospective contractor and subcontractors);• Have the necessary production, construction, and technical equipment and facilities, or the ability to obtain them; and• Be otherwise qualified and eligible to receive an award under applicable laws and regulations.
REWORK	<p>The process of taking a defective part and working on it again to correct the identified deficiencies.</p>
RISK	<p>The probability of not attaining the goals for which the party entered into a contract. For the contractor (seller), the principal business or financial risk is an unexpected loss of money on the contract. For the Government, the principal risks are that:</p> <ul style="list-style-type: none">• The total cost of the acquisition will be higher than expected or unreasonable in relation to the actual costs of performance.• The contractor will fail to deliver or will not deliver on time.• The final deliverable will not satisfy the Government's actual need, whether or not "acceptable" under the terms and conditions of the contract.• The Government's need will change prior to receipt of the deliverable.
ROUND-TABLE ESTIMATES	<p>Estimates developed by experts, usually without detailed drawings or a bill of materials and with limited information on specifications.</p>
ROYALTIES	<p>Fees paid by the user to the owner of a right, such as a patented design or process.</p>
SAMPLING	<p>Estimating based on a sample of items or other units. If the sampling is random, every item has an equal chance of being selected for analysis.</p>

GLOSSARY

SCRAP	Excess material that is no longer usable for the purpose for which it was originally intended. For example, a sheet of metal may have a variety of shapes cut from it. The leftover pieces that are too small to cut into the required shapes are scrap.
SECONDARY POOL	The secondary pool is an intermediate pool that is used to allocate costs to primary pools.
SEMI-VARIABLE COST	Costs that include both fixed and variable elements.
SERVICE CONTRACT <i>FAR 37.101</i>	A contract that directly engages the time and effort of a contractor whose primary purpose is to perform an identifiable task rather than to furnish an end item of supply.
SHOULD-COST ANALYSIS	Estimating what the cost of a contract should be, assuming reasonable economy and efficiency.
SMALL PURCHASE <i>FAR 13.101</i>	The acquisition of supplies, nonpersonal services, and construction through the "simplified procedures" (e.g., imprest funds, purchase orders, and blanket purchase agreements) prescribed in Part 13 of the FAR.
SOLE SOURCE ACQUISITION <i>FAR 6.003</i>	A contract for the purchase of supplies or services that is entered into or proposed to be entered into by an agency after soliciting and negotiating with only one source.
SOLICITATION	A document requesting or inviting offerors to submit offers. Solicitations basically consist of (a) a draft contract and (b) provisions on preparing and submitting offers.
SOURCE SELECTION <i>FAR 15.612</i>	<p>The process of soliciting and evaluating offers for award. Formal source selections usually involve the:</p> <ul style="list-style-type: none">• Establishment of a group (e.g., a Source Selection Board) to evaluate proposals.• Naming of a Source Selection Authority, who might be the CO, the requiring activity manager, or a higher level agency official, depending on the size and importance of the acquisition.• Preparation of a written source selection plan.

GLOSSARY

SPECIAL TEST EQUIPMENT	Single or multipurpose integrated test units engineered, designed, fabricated, or modified to accomplish special purpose testing in performing a contract.
SPECIAL TOOLING	Jigs, dies, fixtures, molds, patterns, taps, gauges, and other equipment and manufacturing aids (along with all components of these items), which are of such a specialized nature that without substantial modification or alteration their use is limited to the development or production of particular supplies or the performance of particular services.
SPECIFICATION <i>FAR 10.001</i>	A description of the technical requirements for a material, product, or service that includes the criteria for determining whether the requirements are met.
SPOILAGE	Materials that <ul style="list-style-type: none">• Have lost their usable properties, due to obsolescence, rot, decay, etc.• Are lost, due to theft, misplacement, or accidental disposal.
STANDARD <i>FAR 10.001</i>	A document that establishes engineering and technical limitations and applications of items, materials, processes, methods, designs, and engineering practices; includes any related criteria deemed essential to achieve the highest practical degree of uniformity in materials or products, or the interchangeability of parts used in those products.
STANDARD COST	A method for pricing items in inventory. Under standard costing, the value of inventory equals the number of units times the unit standard cost. Standard costs are usually based either on expected prices for the period in question (sometimes as short as a week) or on prices prevailing at the time the standards are set. Standard costs do NOT change in response to short-term fluctuations in volume, quantity, or cost of units.
STANDARD TIME DATA	Predetermined level times developed for groups of motions that are commonly performed together. Each such group constitutes a separate and distinct “element”. Also known as Elemental Standard Data.
STATEMENT OF WORK (SOW)	The complete description of work to be performed under the contract, encompassing all specifications and standards established or referenced in the contract. The SOW constitutes Part C of the Uniform Contract Format.

GLOSSARY

STRATIFIED SAMPLING	As used in this course, stratified sampling means dividing items of cost into groups, called strata (stratum in the singular), and separately developing a prenegotiation position for each stratum based on a random sample of items in the stratum.
STRUCTURED BREAKDOWN	A breakdown of the total proposed cost through increasing levels of detail to the most basic element—the work package.
SUBCONTRACT <i>FAR 44.101</i>	Any contract entered into by a subcontractor to furnish supplies or services for performance of a prime contract or a subcontract. It includes but is not limited to purchase orders, and changes and modifications to purchase orders.
SUBCONTRACTOR <i>FAR 44.101</i>	Any supplier, distributor, vendor, or firm that furnishes supplies or services to or for a prime contractor or another subcontractor.
SUBSTANTIAL QUANTITY <i>FAR 15.804-3(c)(4)</i>	An item is “sold in substantial quantities” only when the quantities regularly sold are sufficient to constitute a real commercial market. Nominal quantities, such as models, samples, prototypes, or experimental units, do not meet this requirement. For services to be sold in substantial quantities, they must be customarily provided by the offeror, using personnel regularly employed and equipment (if any is necessary) regularly maintained solely or principally to provide the services.
SUMMARY ESTIMATE	An estimate of material costs made without knowledge of quantity requirements and per unit prices. Summary estimates may be made by using “round-table” or comparison techniques.
SUPPLIES <i>FAR 2.1</i>	All property except land or interest in land, including (but not limited to) public works, buildings, and facilities; ships, floating equipment, and vessels together with parts and accessories; aircraft and aircraft parts, accessories, and equipment; machine tools; and the alteration or installation of any of the foregoing.
TASK ESTIMATING	An estimate the number of people and the time required to perform a task.

GLOSSARY

TECHNICAL ANALYSIS <i>FAR 15.801</i>	Examination and evaluation by personnel having specialized knowledge, skills, experience, or capability in engineering, science, or management of proposed quantities and kinds of materials, labor, processes, special tooling, facilities, and associated factors set forth in a proposal in order to determine and report on the need for and reasonableness of the proposed resources assuming reasonable economy and efficiency.
TECHNICAL FACTORS <i>FAR 9.104-2 and 15.605</i>	Factors other than price-related used in evaluating offers for award. Examples include technical excellence, management capability, personnel qualifications, prior experience, past performance, and schedule compliance.
TERMS AND CONDITIONS	All language in a solicitation and contract, including amendments, attachments, and referenced clauses and provisions.
TIME AND MATERIALS CONTRACT <i>FAR 16.601(a)</i>	A type of contract that provides for acquiring supplies or services on the basis of (1) direct labor hours at specified fixed hourly rates that include wages, overhead, general and administrative expenses, and profit and (2) materials at cost, including, if appropriate, material handling costs as part of material costs.
TIME STUDY	A study to established leveled times for the performance of distinct, describable, and measurable unit of work (or job elements).
TRUTH IN NEGOTIATION ACT	This Act requires contracting officers to obtain accurate, complete, and current cost or pricing data from contractors. It also provides the Government with a price reduction remedy if a contractor fails to comply. This remedy takes effect when the contractor does NOT submit accurate, complete, and current data for a contract and the Government relied on the “defective data” in determining the contract price. The purpose of the Act is to put the Government on equal footing with contractors when negotiating noncompetitive or sole-source contracts.
UNALLOWABLE COST <i>FAR 31.001</i>	Any cost which, under the provisions of any pertinent law, regulation, or contract, cannot be included in prices, cost-reimbursements, or settlements under a Government contract to which it is allocable.

GLOSSARY

UNBALANCED OFFERS <i>FAR 15.814(b)</i>	<p>An offer is mathematically unbalanced if it is based on prices which are significantly less than cost for some contract line items and significantly overstated in relation to cost for others. An offer is materially unbalanced if it is mathematically unbalanced, and if—</p> <ul style="list-style-type: none">• There is a reasonable doubt that the offer would result in the lowest overall cost to the Government, even though it is the lowest evaluated offer; or• The offer is so grossly unbalanced that its acceptance would be tantamount to allowing an advance payment.
VARIABLE COST	<p>Costs that remain constant on a per unit basis no matter how many units are made in the relevant range of production. Total variable cost increases as the number of units increases, and vice versa.</p>
VARIANCE <i>FAR 31.001</i>	<p>The difference between a preestablished measure and an actual measure.</p>
VOLUME	<p>Total goods and services sold (or expected to be sold) to ALL customers during an accounting period.</p>
WEIGHTED AVERAGE COST <i>FAR 31.001</i>	<p>An inventory costing method under which an average unit cost is computed periodically by dividing the sum of the cost of beginning inventory plus the cost of acquisitions by the total number of units included in these two categories.</p>
WEIGHTED AVERAGE LABOR RATE	<p>A single labor rate for two or more categories of labor that averages the individual labor rates of the categories with weight given to the number of employees in each category.</p>
WEIGHTED GUIDELINES	<p>The DoD structured approaches for determining profit or fee prenegotiation objectives.</p>
WORKING CAPITAL	<p>The money required to finance contract expenses until contract payment is received.</p>
WORK BREAKDOWN STRUCTURE	<p>See STRUCTURED BREAKDOWN</p>

GLOSSARY

WORK PACKAGE

Detailed short-span tasks identified and controlled in assigning work within the offeror's organization and accomplishing work required to complete a contract. A work package defines the work required by a specific worker or group of workers to accomplish a task.

WORK SAMPLING

Sampling of the proportion of time spent on by one or more persons or machines on a given activity. This is useful for jobs with irregular components that vary in the amount of time per unit of output.

FAR REFERENCES

FAR REFERENCES

References to Cost Accounting Standards (CAS)

CAS 401	3-12, 3-14
CAS 402	3-12, 3-16, 9-13
CAS 405	3-12, 3-16
CAS 406	3-12, 3-16
CAS 414	11-3ff, 12-18, 13-30ff
CAS 417	11-3ff
CAS 418	8-44
CAS, list of standards.....	3-15

References to Comptroller General Decisions

B-189884	2-12
B-224182	14-8
B-235208	14-7
B-237054,	14-12
B-237531.3	14-7
B-237555	14-18
B-238099.2	14-14
B-238259	14-14ff
B-238402	14-9
B-238877	I-7

References to the Federal Acquisition Regulation

3.501	I-7
8.8	9-20
9.103(c)	I-8, 14-4, 14-14
15-810	5-42
15 Table 15-2	2-21ff, 5-5, 7-5, 9-5, 10-19, 10-26
15.605	I-10, I-11
15.606	5-30, 13-7
15.608	I-8, 14-4
15.610	13-7
15.801	I-2, 1-6, 2-6, 5-17

FAR REFERENCES

15.802(b)	I-5
15.803	1-14
15.803(c)	I-11
15.803(d)	I-6, I-7, I-11, 14-7
15.804-3(b)	2-11
15.804-3(c)	2-11
15.804-3(h)	2-7
15.804-4	2-27
15.804-4(g)	10-47
15.804-6	2-5
15.804-6(a)	2-32
15.805-2	1-10, 1-11
15.805-3	1-12, 4-5, 5-17
15.805-4	4-19
15.805-5(d)	4-31
15.805-5(e)	4-26, 4-30
15.806	7-41
15.806-3(a)	4-28
15.808	4-12
15.809	10-26
15.810	5-22
15.901(a)	12-4
15.901(b)	12-6
15.901(c)	12-6, 12-8
15.902	12-3
15.902(a)	12-5
15.903	12-8
15.903(c)	11-7
15.903(d)	13-17, 13-18
15.905-1	12-5, 12-7
15.905-1(a)	12-10
16.102(c)	5-37
16.202	5-33
16.203	5-33
16.204	5-34

FAR REFERENCES

16.304.....	5-35
16.305.....	5-35
16.306.....	5-36
22.101-2	8-40
22.103.....	8-51
22.602.....	8-42
22.1002.....	8-41
22.11	8-42
22.403-1	8-41
30.....	3-12, 10-9
30.2.....	3-14
30.414.....	11-5
31.....	3-20
31.201-1	1-6, 1-8, 1-20
31.201-6	3-16 & 3-25
31.202.....	1-6, 9-13, 10-8, 10-9
31.203.....	1-6, 9-13, 10-5, 10-8, 10-9
31.203(b)	10-39
31.203(e)	10-39
31.205.....	3-18ff, 10-38
31.205-1	3-27ff
31.205-6	8-40
31.205-7	3-27, 3-29, 5-13
31.205-8	3-27 & 29
31.205-10	11-6
31.205-19	7-8
31.205-20	11-6
31.205-26	7-6, 7-8
31.205-30	9-24
31.205-37	9-24
31.205-41	9-21ff
31.205-45	7-8
31.205-46	3-27 & 29
31.205-46	9-8
31.205-52	11-6

FAR REFERENCES

42.7	10-27
42.705	10-28
42.705-1	10-47
42.705-2	10-47
45.101	9-15
52.215-22	2-29
52.215-23	2-29
Appendix B	3-12, 10-9
SF 1411	2-5, 2-18ff
SF 1412	2-13, 2-15, 2-16

FAR REFERENCES

INDEX

Note: This is a key reference index, highlighting pages that present the most significant treatment of the term. No attempt was made to identify every page on which a given term appears. Where a page number is followed by "ff" (as in 10-12ff), coverage continues on the pages that follow.

INDEX

Acquisition Histories (see Procurement Histories)	
Administrative Contracting Officers (see also Defense Contract Management Command)	
and assist audits	4-29
responsibility for determining allowability	3-20
forward pricing rate agreements	4-13ff, 8-40, 10-26
overhead analysis	10-41
should cost reports	5-24
Advertising Costs	3-28
Applied Overhead	10-31
Area Wage Surveys	8-42
Below-Cost Prices	1-7
Bill of Materials	6-5ff, 7-24ff
Accounting Practices and Standards	3-12ff
Adequate Price Competition, exemption for	2-11, 2-12
Allocability	3-10ff
Allocation Bases (see Indirect Cost Bases)	
Allowability (chapter on)	3-1ff
Assist Audits	4-28ff
Assumptions, of offerors	5-8ff
Audits	4-24ff
exceptions to findings	4-32
need for	4-25
requests for	4-26ff
review of	4-30ff
“Based-On” Exemptions	2-12
Bases (see Indirect Cost Bases)	
Basic Motion Standard Data	8-32
Best-And-Final Offers, cost realism of	14-8ff
Billing Rates	10-23, 10-27
Catalog Pricing, exemption for	2-11, 2-13
Certificate Of Current Cost Or Pricing Data	2-26ff
and defective data	2-29ff
elements of	2-28ff
obtaining	2-27

INDEX

Certification	
by subcontractors	7-43
of cost or pricing data.....	2-26ff
of indirect costs	10-47
Class of Positions	8-6
Classifications, of direct labor	8-6ff
Collateral Costs	7-8
Collective Bargaining (see Labor-Management Agreements)	
Comparison Estimates (see Direct Comparisons)	
Computer Time, as an ODC	9-19ff
Consultants and Contract Labor, as ODCs	9-9ff
Consumer Price Index (see Indexes)	
Contract Requirements	5-38
Contingencies	
cost principle on	3-27ff
in offeror proposals	5-13ff
policy on.....	I-13
Contract Cost	
definition	1-6
types	1-8
Contract Pricing Proposal Cover Sheet.....	2-19ff
Contract Terms.....	3-17
Contract Types	
and prenegotiation objectives.....	13-13ff
definitions.....	5-32ff
impact on contract risk	5-31ff
table of.....	5-44ff
Contractor System Reviews	4-14ff
Contributions and Donations	3-27ff
Contribution Income	6-38ff
Conversion Cost	10-17
“Cost”, definition of	1-7
Cost Accounting, definition of.....	1-16

INDEX

Cost Accounting Standards	1-16ff, 3-12ff, 10-9
and facilities cost of capital	11-3ff
application to	3-12ff
exemptions	3-13
summaries of CAS 401, 402, 405 and 406	3-14ff
table of	3-15
Cost Analysis	
definition of	1-12
initial steps	1-14ff
when performed	1-12
Cost Drivers (see also Cost Estimating Relationships)	13-8ff
Cost Estimating Relationships	6-55ff
application	6-56
definition	6-56
in estimating labor costs	8-20, 8-24ff
in estimating material costs	7-17, 7-18, 7-21
steps in developing	6-58ff
Cost Estimating	
definition of	1-16
principles and methods	1-20ff
Cost of Goods Manufactured	10-17
Cost or Pricing Data	2-1ff
definition of	2-5, 2-6
exemptions from	2-10ff
requirement for	2-7ff
tailoring of	2-25
waivers of	2-17
Cost Principles	3-19ff
and unallowable costs	3-24
table of	3-21
Cost Realism Analysis	14-1ff
and unrealistic BAFOs	14-8ff
objective and purpose	14-4
steps in	14-5ff
Cost Reimbursement Contracts (See Contract Types)	

Cost Risk	
and contract types.....	5-31ff, 13-11
assessments of	5-28ff, 13-10ff
in trade off analysis	13-10ff
sources of	5-26ff, 13-10ff
Cost-To-Cost Relationships	6-56ff
Cost-Volume-Profit Analysis.....	6-25ff
calculating fixed cost	6-30
calculating profit	6-36
calculating total cost.....	6-28
calculating variable cost.....	6-29
steps in graphing	6-31ff
Cumulative Average Improvement Curves.....	6-80
Data Collection	4-1ff
Davis-Bacon	8-41
Decrement Factor	6-7
Defense Contract Audit Agency	4-26, 6-5, 8-42
Defense Contract Management Command	4-5, 4-19ff
DD Form 1547	12-19ff
DD Form 1861	11-19
Defective Data.....	2-29ff
Defective Parts	7-11
Detailed Estimates.....	1-20ff, 7-23ff
Development Cost.....	1-7
Direct Comparisons	
as a method of estimating.....	1-20ff
in estimating labor hours	8-19ff
in estimating material costs	7-18ff
Direct Cost, definition	1-6
Direct Labor	8-1ff
analysis of mix	8-9ff
classifications of.....	8-6ff
types of	8-8
Direct Labor Mix	8-5ff, 8-9ff
Direct Material Costs	
proposed quantities	7-24ff
summary estimates	7-15ff
types of estimates	7-14
unit prices	7-29ff

INDEX

Direct Material Mix	7-5ff
analysis of	7-12ff
collateral costs	7-8
elements of	7-6ff
related costs	7-9ff
Direct Materials	7-1ff
Direct/Indirect Cost Decision	10-8ff
Disposal Cost	1-7
Documentation	13-20ff
DoD Weighted Guidelines	12-17ff
calculation	12-21ff
exemptions from	12-37
Economic Forecasts	6-50ff
preparing	6-52ff
sources of	6-51
Economic Risk	5-27
Efficiency Factors	8-34ff
Elemental Standard Data	8-32
Engineering Labor	8-8
Estimating Techniques	6-1ff
Evaluated Price	I-10
Evaluation Factors, price and non-price	I-10ff
Facilities Capital Cost of Money	11-1ff
allowability of	11-6ff
and Cost Accounting Standards	11-8
application	11-16ff
factor development	11-9ff
profit prenegotiation objectives	11-7, 12-8, 12-12, 12-14, 12-32ff
Fair and Reasonable Price	I-6ff
Federal Excise Taxes	9-21ff
Fee (See Profit)	
Field Pricing Reports	4-20
Final Indirect Cost Rates	10-24ff, 10-28ff
Fixed Price Contracts (See Contract Types)	
Fixed Cost	6-26, 6-30
Flexible Budgets	10-21
Flexible Contracts	14-8

INDEX

Forward Pricing.....	10-25ff
Forward Pricing Rate Agreements.....	10-26
Forward Pricing Rates.....	10-25ff
analysis of	10-38ff
from prior proposals.....	4-13
General and Administrative Expenses	10-7
examples.....	10-13, 10-35ff
typical bases	10-17
Generally Accepted Accounting Principles	3-16, 10-9
Government Furnished Property, impact on contract risk	5-39
Government Recommended Rates.....	10-25
Job Order Cost Systems	1-17
Improvement Curves	6-74ff
analysis of	8-28ff
applicability.....	6-76ff
calculating slope.....	6-87
calculating theoretical value of first unit.....	6-86
computer models	6-95
drawing.....	6-84ff
estimating cost of future units	6-88ff
improvement factors	6-77ff
fitting	6-94ff
interpretation of.....	6-82ff
labor hour estimates	8-26ff
lot data.....	6-90ff
material.....	7-18
theory	6-75, 6-76, 6-79ff
Indexes	6-10ff
uses.....	6-11
development of.....	6-11ff
Government and commercial	6-14ff
price adjustments for inflation/deflation	6-17ff
Indirect Cost Bases.....	10-16ff, 10-19
Indirect Cost Forward Pricing Rates, analysis of.....	10-38ff
Indirect Cost Pools	10-12ff, 10-20, 10-33ff
Indirect Cost Rates	10-10ff

INDEX

Indirect Costs	10-1ff
allocation cycle	10-24ff
certification of	10-47
definition	1-6
importance and composition	10-5ff
steps in estimating	10-18ff
Inflation	5-12, 6-17ff
Inspector General	I-6, 4-26
Interorganizational Transfers	7-38ff
Inventory Cost	1-8
Inventory Pricing	7-29, 7-35ff
Investment Risk	5-26
Labor Hour Estimates, analysis of	8-11ff
Labor Loading	8-47ff
Labor-Management Agreements	8-34ff
Labor Standards	8-40ff
Level of Effort Estimating	8-17
Leveled Time	8-32ff
Life Cycle Cost	1-7
Limited or Partial Data	2-26
Line-Of-Best-Fit	6-40ff
computer models	6-49
equation development	6-42ff
least-squares-best-fit	6-48
steps in graphing	6-42ff
trends in wage rates	8-50
Manufacturing Labor	8-9
Market Environment	I-14ff
Market Pricing, exemption for	2-11, 2-15
Market Research	4-17
Materials, definition of	7-6
Mistakes, as a test of fairness to sellers	I-8
Moving Averages	6-67ff
development	6-69ff
types	6-72
uses	6-68

NASA	
exemptions from structured profit approach	12-16
Form 634	12-10ff
profit policies	12-9ff
Negotiation Objective (See Prenegotiation Objectives)	
Net Book Value	11-10ff
OFPP Policy Letter 78-2	8-42
Operation & Maintenance Cost	1-7
Other Direct Costs	9-1ff
Overapplied Overhead	10-29
Overhead (see Indirect Costs)	
Overtime	8-51 and 8-52
Parametric Relationships	6-56ff
Participants in Cost Analysis	I-16
Performance Risk	5-27
Personal, Fatigue and Delay Allowance	8-33
Planning Assumptions, of offerors	5-6ff
Plant-Wide Averages	8-46
Pools (see Indirect Cost Pools)	
Position	8-6
Position Classification Plan	8-6ff
Predetermined Level Times	8-32
Prenegotiation Documentation	13-21ff
Prenegotiation Memorandum Checklist	13-25ff
Prenegotiation Objectives, by contract type	13-13ff
Preparing For Negotiations	13-1ff
Preproduction Costs, as ODCs	9-11ff
Price Analysis	
bases	1-11
definition of	1-10
in establishing prenegotiation objectives	13-6
Price, definition of	I-2, 1-6
Price Index Numbers (see Indexes)	
Price Negotiation Memoranda	4-12
Pricing Objectives of Sellers	I-3
Pricing Objectives of the Government	I-5ff
Pricing Approaches of Sellers	I-4

INDEX

Primary Pools	10-14
Prime Contractors, role in subcontract pricing	7-41
Printing Costs, as ODCs.....	9-20
Privity	7-41
Process Cost Accounting	1-18
Procurement Histories	1-15, 4-10ff
Producer Price Index (see Indexes)	
Production Cost.....	1-7
Professional Compensation.....	8-42
Profit or Fee	12-1ff
ceilings	12-6
contract modifications	12-8
contractor motivation	12-6
DoD Structured Approach	12-17ff
factors	12-7ff
general factors	12-4ff
NASA Structured Approach	12-9ff
requirement for structured analysis	12-5
Program Histories	1-15, 4-8ff
Proposals, reviewing against RFP.....	1-15, 4-6
Public Relations and Advertising Costs.....	3-27ff
Quotes	7-29ff
Random Sample (see Sampling)	
Realization Factors.....	8-34ff
Reasonableness, price	1-9ff
Reasonableness, as an allowability factor.....	3-7ff
Regulated Pricing, exemption for	2-11, 2-16
Requests For Proposals	1-14
Responsibility.....	1-8
Rework (see Scrap)	
Round-Table Estimates	1-20ff, 8-16ff
Royalties.....	9-23ff
Sampling	6-5ff
of items in a Bill of Materials	6-5ff, 7-25
random	6-5
stratified	6-5
of work	8-33

Scrap	
definition	7-10
rate estimates	7-27ff
Secondary Pools	10-14
Semivariable Cost	6-26
Service Centers	10-15
Service Contract Act	8-41
Service Labor Categories	8-8ff
Should-Cost Analysis	5-17ff
causes of inefficient or uneconomical performance	5-18ff
formal	5-22ff
potential sources of data	5-21
Special Allowances	8-33
Special Tooling and Test Equipment, as ODCs	9-15ff
Specifications/Statements of Work	1-14, 4-6ff, 5-38
Spoilage	7-10
SF 1411	2-5, 2-18ff
Standard Time Data	8-32
Structured Breakdowns	5-15ff
Subcontract Pricing	7-41ff
Subcontract Requirements	7-40ff
Summary Cost Estimates	7-15ff
examples	7-21ff
steps in analyzing	7-16ff
Stratified Sampling (see Sampling)	
Task Estimating	8-16
Table 15-2	2-21ff
Technical Reviews	
analysis of	4-20ff
requests for	4-19
Time Study	8-32
Total Cost Input, as a base	10-17
Trade-Off Analysis	13-5ff
and cost risk	13-10ff
cost drivers	13-8ff
role of negotiation team	13-7
Travel	3-27ff, 9-6ff
Trend Analysis, wage rates	8-48

INDEX

Truth in Negotiation Act	2-6
Unfair Prices	I-6, I-11
Unallowable Costs, identifying	3-24ff, 10-38
Uncompensated Overtime	8-52
Underapplied Overhead	10-29
Unit Improvement Curve	6-79
Value Added Cost Input Base	10-17
Variable Cost.....	6-26, 6-29
Volume	10-18ff
Wage Rates	8-39ff
analysis of	8-40
geographic location	8-41ff
labor laws	8-41ff
time periods	8-47ff
variation in skill	8-43ff
work force conditions.....	8-51ff
Walsh-Healy.....	8-42
Weighted Average Labor Rates	8-43ff
Weighted Guidelines (See DoD Weighted Guidelines)	
Work Design Analysis, use of.....	5-42
Work Package	5-16